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ANIMAL KINGDOM

NEW YORK ZOOLOGICAL SOCIETY

VOLUME LIV

JANUARY TO DECEMBER, 1951

NUMBERS 1–6

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U. S. NATIONAL MUSEUM

INSTRUCTIONS TO BINDER

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ANIMAL KINGDOM

THE MAGAZINE OF THE NEW YORK ZOOLOGICAL SOCIETY

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ANIMAL KINGDOM

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Man Can Not Stand Alone

THERE IS AN OLD SAYING, "Man is a law unto himself." In some respects it is one of the most misleading observations that could be made regarding human life. It expresses an attitude that lies at the bottom of many of the troubles that beset us today. It is an unfortunate concept, to say the least, from a social or ethical point of view. Further, regrettably, the belief has invaded other fields than manners and conduct and has crept into much of our scientific thinking. It helps to sustain the powerful school of thought that science, or, more especially, the technologies that science has developed, can in themselves provide the solutions for many of our present-day problems. Primary among these are adequacy of resources to sustain not only our *way* of life, but life itself. For the moment the physicist, the chemist, or the engineer is in the driver's seat and the voice of the biologist or zoologist is scarcely heard. In the end biological principles must be acknowledged in our human affairs because man is irrevocably a part of his natural environment. Unless we recognize the laws that operate the economy of nature we will so injure the productive capacity of the earth that we shall come to a dead-end street.

One of the most evident principles of biology is that which deals with the impact of population growth within any given region, whether it be a nation or whether it be the world as a whole. Imbalances between populations and natural resources obviously create social and political tensions, and to them, I believe, can be traced in large part today's terrific social tensions, present wars and threats of greater wars.

It might be observed that while the United Nations last year held a world-wide conference on resources, it has not as yet held such a conference on population problems. You can't get the whole answer if you are just dealing with fractions.

Every cultural institution is involved in one way or another in the present maelstrom of conflicting human interests. In these times there are no happy, isolated enchanted islands. As one of the leading institutions expressing nature and its principles we have a special job to do both in public service and in encouraging a better understanding of man's relationship with the world around him. I might point out that in a world devoid of other living creatures – from protozoa to whales – man, himself would die. This is another kind of principle of relativity – the relatedness of all living things. Let's get over the idea that man is a law unto himself.

Fairfield Osborn

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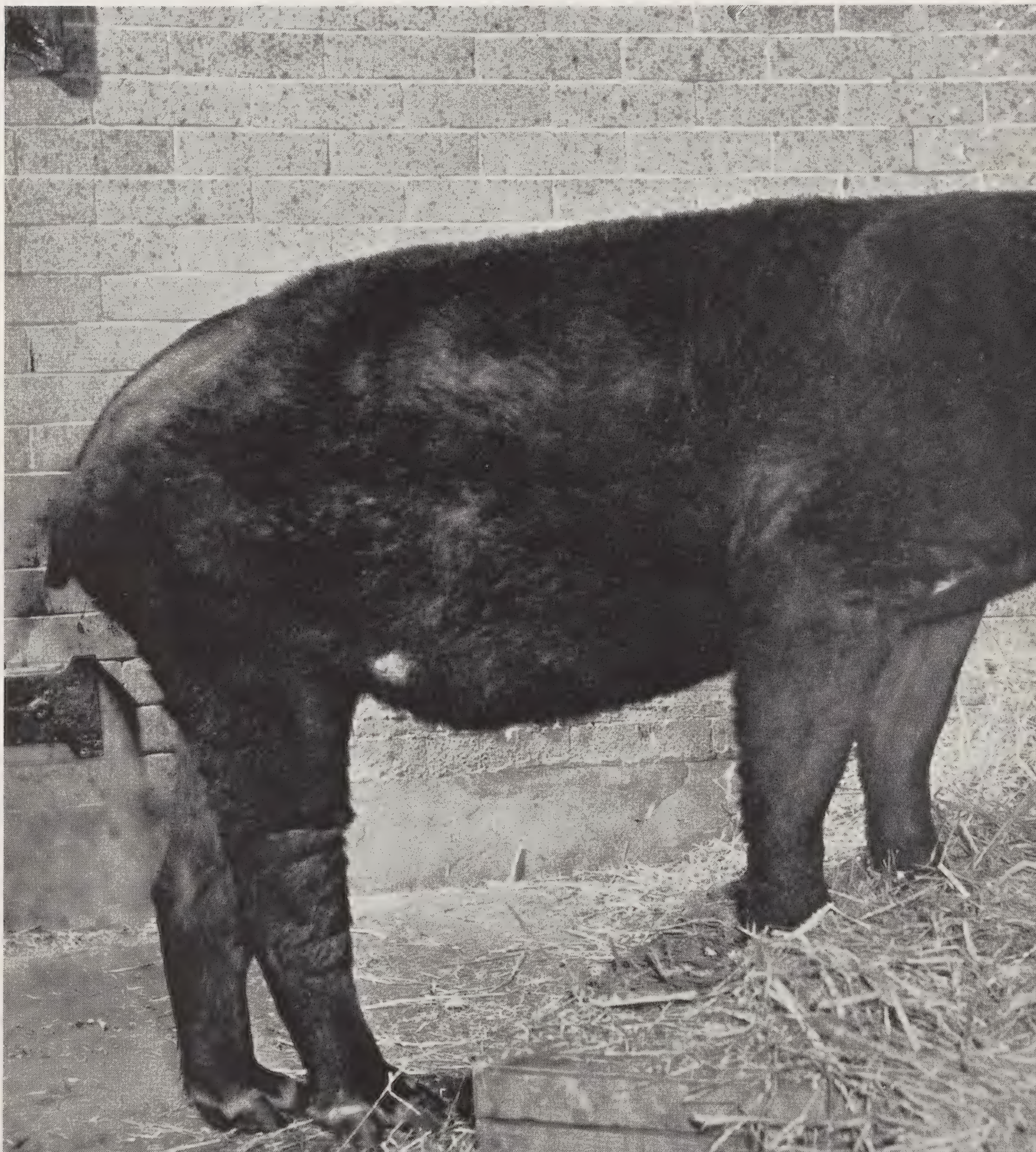
"Panchita" is probably the first Mountain Tapir exhibited in the New World, and perhaps anywhere. She is still a young animal, said to be about two and a half years old. The bare skin around her feet is one characteristic of this particular species.



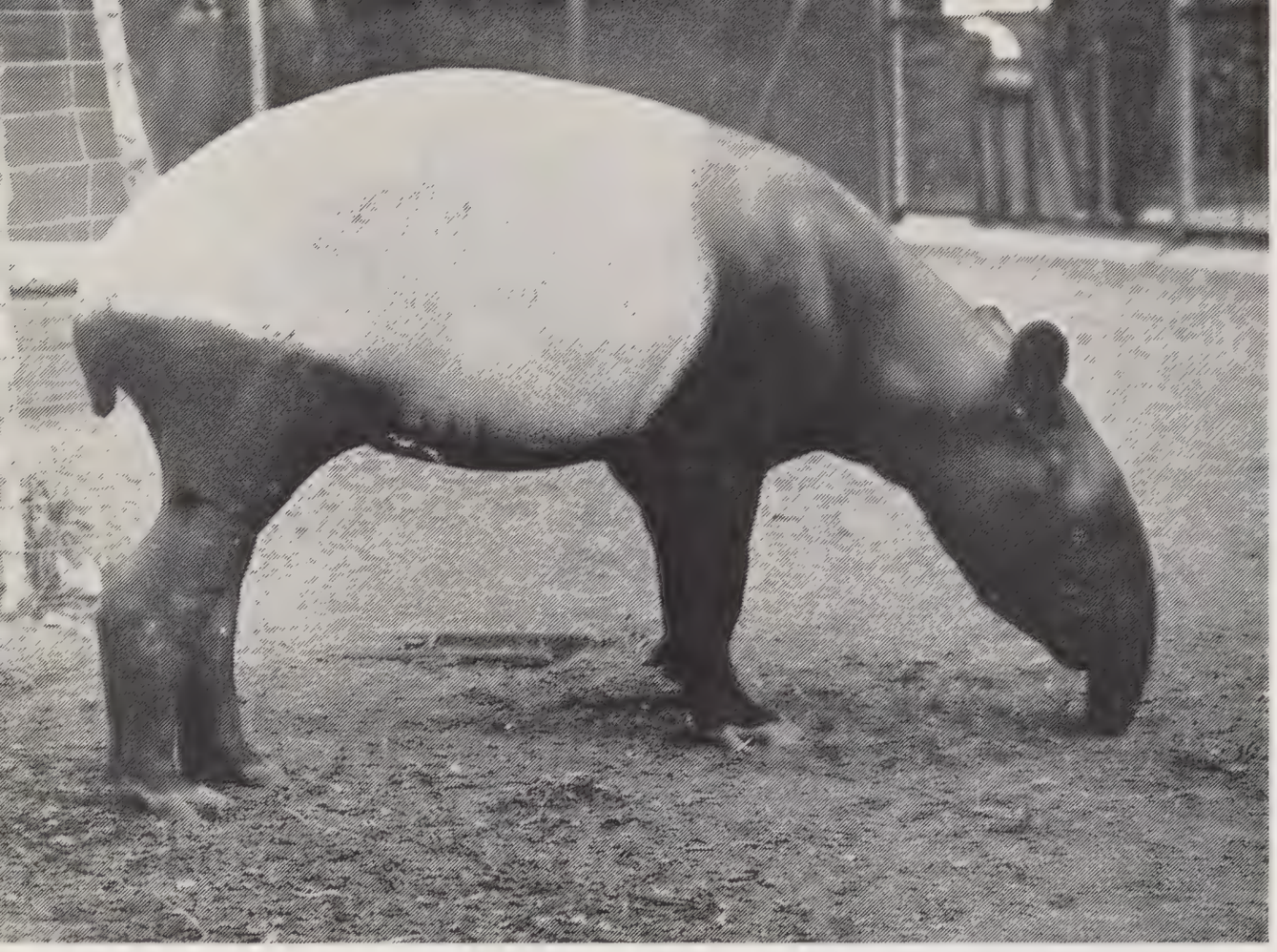
The MOUNTAIN TAPIR *in the Bronx Zoo*

By LEE S. CRANDALL

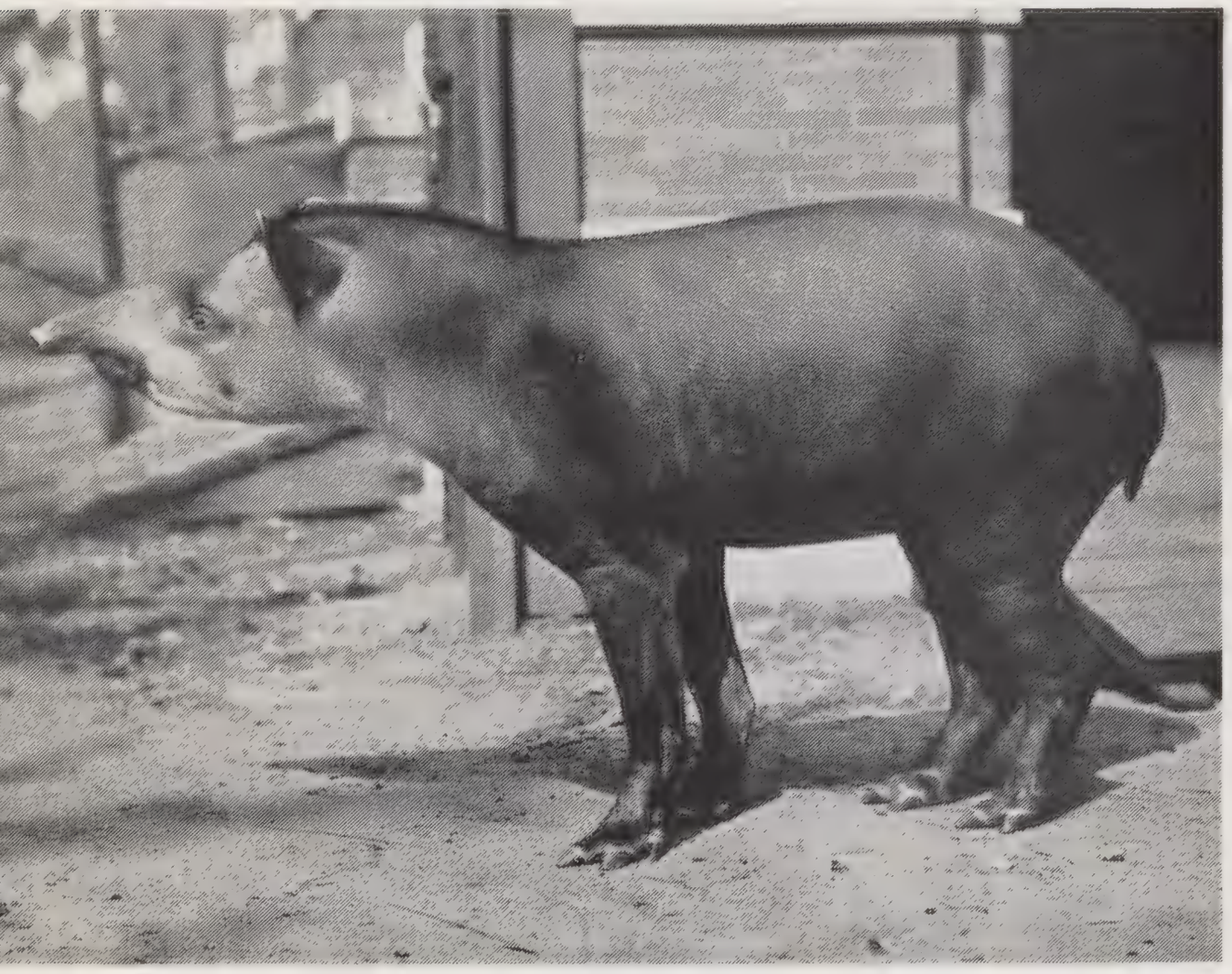
THERE SEEMS TO BE no consistent pattern for the acquiring of animal rarities. Some come as the result of elaborate plans – for example, the Congo Peacock, the Okapi and the Mountain Gorilla from the Belgian Congo. On the other hand, a small box, arriving unheralded from Central America by air, contained an animal said to be a fox but which proved to be the second living Yapock or Water Opossum to be recorded in captivity. We sent Charles and Emy Cordier to Ecuador in 1949-1950 for Umbrella Birds, Cocks-of-the-Rock, hummingbirds and a Mountain Tapir. Elaborate plans again – but not entirely successful, for the Cordiers brought us the birds but no tapir. But that story has now achieved a happy ending.

In the midst of his many Ecuadorian activities, Charles never ceased his search for a tapir. Rumors flew but no tapir materialized. Advertisements in the Quito newspapers produced no better result. Then, almost at the moment of departure, there came a report of a tapir living as a village pet in a hamlet called Borja, sixty miles to the east of Quito at an elevation of about 6,000 feet. It was too late for Charles to travel so far and the efforts of an intermediary resulted only in a rise in the asking price so astronomical that negotiations were abruptly dropped.

At the flying field, as Charles was about to take off with his hard-won cargo, he told the tale to Rolf Blomberg, a Swedish explorer resident in Quito, giving him a free hand to continue if he could. Failing to accomplish the purchase



The gray-blanketed Malay Tapir is the most spectacular of them all, and the only tapir in the Old World.



The South American Tapir comes from swampy lowland jungles. It is the one most often seen in captivity.

Baird's Tapir is sometimes called the Giant Tapir, for it attains a weight of 600 pounds or more. It is rare.

through the channels established by Charles, Mr. Blomberg set out for Borja, found the tapir as reported and was able to buy it on a reasonable basis.

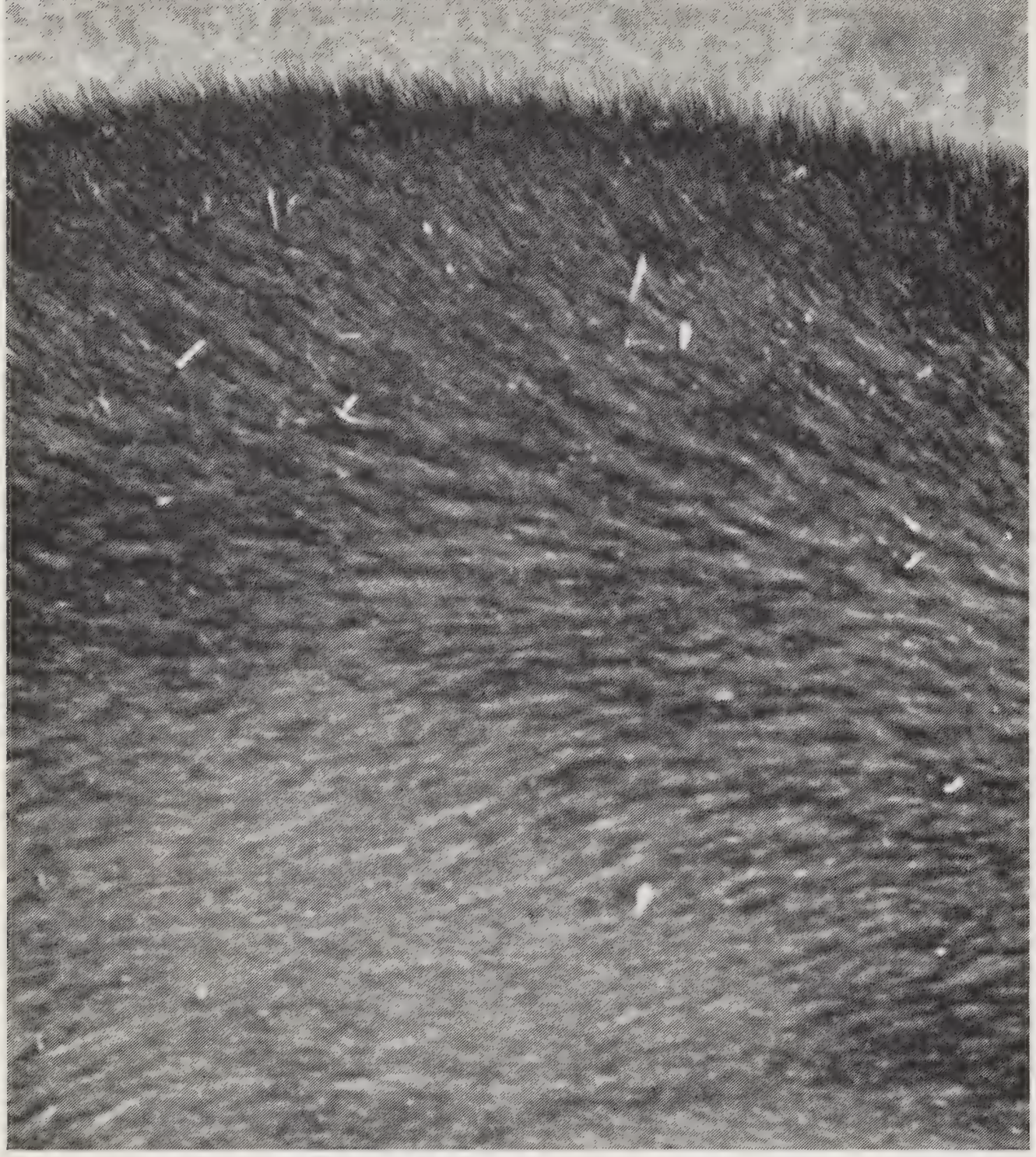
"Panchita," as the villagers called the animal, had been captured higher up the Andean range while still in her striped and spotted coat of tapir infancy. Cared for by a woman of the village until she became independent, Panchita had always wandered where she would, petted and pampered by all. Now, at the reputed age of two and one-half years, she faced, for the first time, the indignity of a crate. For several days, willing hands bore their burden up the steep mountain trails to the main road, where Mr. Blomberg waited with a car to carry her to Quito.

When word of Panchita's safe arrival in Quito first reached us, we found ourselves in a quandary. Mr. Blomberg was sure he had a Mountain Tapir. With due respect to his opinion, so little is known of this almost fabulous animal, and descriptions of its external characters are so confusing, that it was difficult for us to decide whether or not to order the tapir to be shipped to New York. Charles had learned that the natives of Borja had reported the "brown" or Lowland Tapir as living just below them and the "black" one just above. A mistake might easily have been made by Mr. Blomberg, in all innocence. We hesitated a few days, and then came a letter from Quito with three tiny photographs. They resolved our indecision; Panchita might not be a Mountain Tapir, but she was certainly unlike any other tapir we knew about. A telegram was dispatched and Panchita was soon on her way north by airplane.

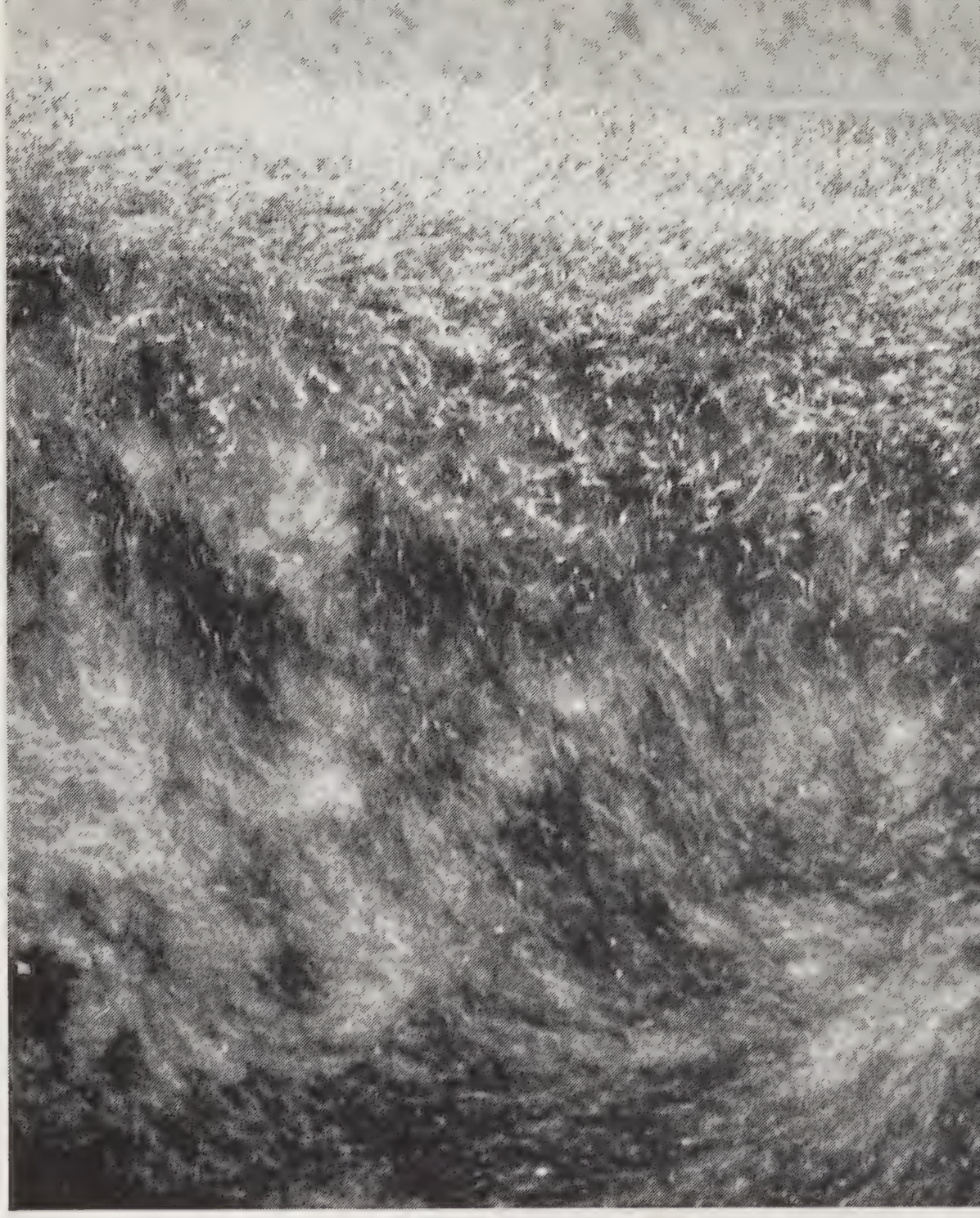
Her arrival naturally climaxed a period of interest and mounting excitement. It all ended when her crate was adjusted to the entrance of a stall at the Elephant House and the slide was slowly lifted. Cautiously, Panchita put forth her head and our doubts were ended. No tapir with a head like that had ever been seen here before.

Slowly, Panchita stepped into the stall and revealed tapir characters in accord with those seen at first glimpse. Her body is clothed with dense, matted hair, blackish-brown in color, while her head to its junction with the neck is of a paler hue. Individual hairs from the back are approximately an inch long, most of them with

Roads on the east slope of the Andes are "passable" — and that is about all that can be said for them. Our Mountain Tapir was carried from the village of Borja to this road, and thence by automobile to the Quito airfield.



Hair on the back of Baird's Tapir is straight, black and rather sparse. This is a section of the mid-back.



Quite different from the hair of other tapirs is tha "Panchita." It is dense and matted, really kin

A close-up view of the forefeet of the Mountain Tapir clearly shows light areas of bare skin above the toes.

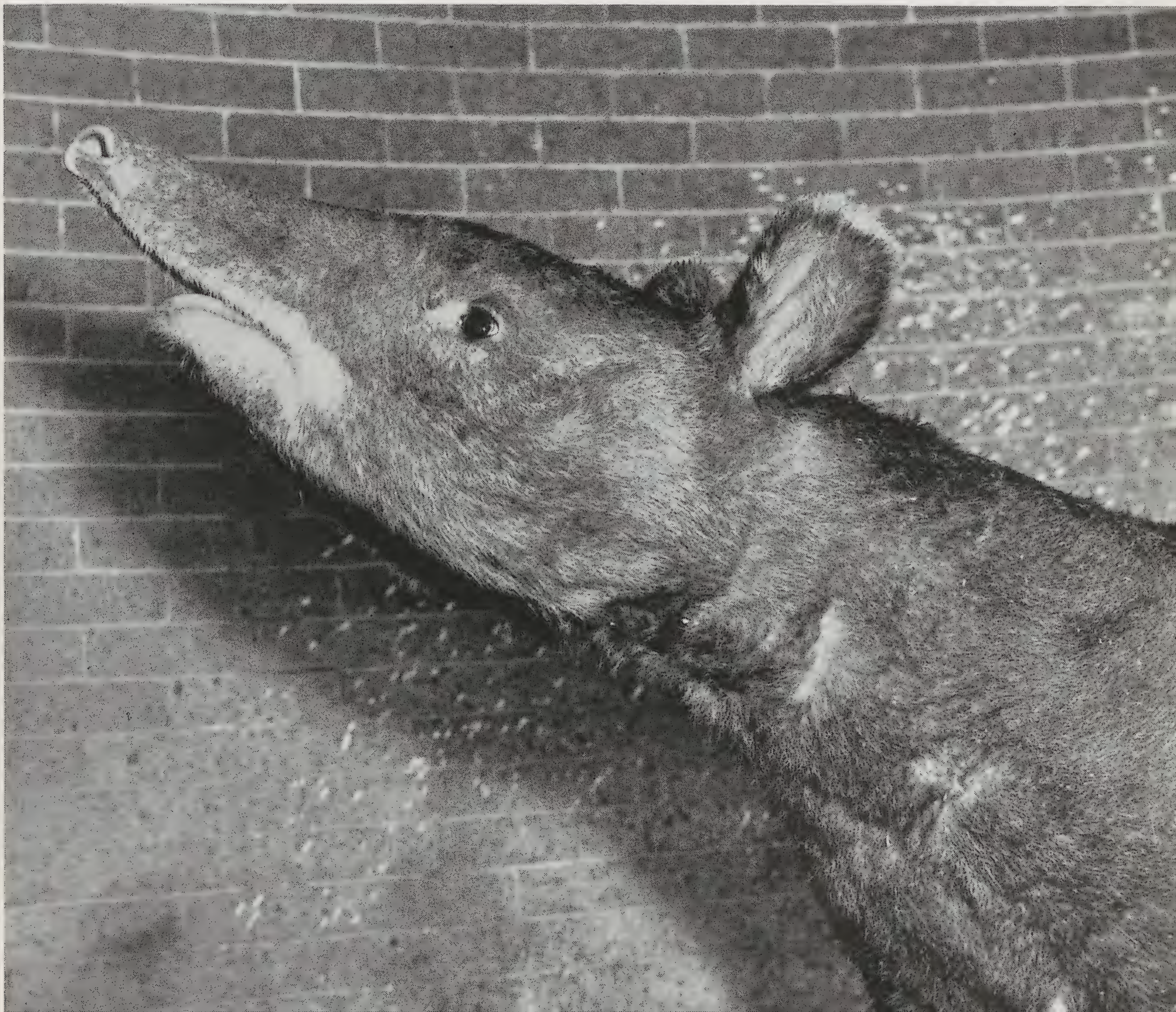
A double patch of bare skin on the rump, divided a line of hair, is reported to be typical of this ta

one or two kinks. The white fringe at the ear tips, present in all tapirs, is especially conspicuous in Panchita, because of the length and density of the hair. Perhaps Panchita's most noticeable color feature is the broad white band, nearly an inch wide, that extends entirely around both lips. To make the description complete, there is a half-inch ring of bare whitish skin above the toes all around, the "face" profile is definitely convex, there is no crest between the ears and no hairy mane upon the nape. Also, the eyes are pale brown – not blue, as often stated. Finally, her weight, at the reputed age of two and one-half years, was 223 pounds.

There are other tapirs in the world, of course, besides the Mountain. In our BULLETIN for March-April, 1929, there appeared a piece by Dr. Hornaday, called, "Tapirs, So Far As Known." In it, the author refers to what he considered to be the "four real species of tapirs"—the black, gray-blanketed Malay Tapir (*Tapirus indicus*) from the Malay Peninsula; the South American, or Lowland, Tapir (*Tapirus terrestris*), found in the swampy lowland jungles of tropical South America; Baird's Tapir (*Tapirella bairdi*) of Central America; and Dow's Tapir, now considered to be identical with Baird's. There is no mention of the Mountain, Andean, Woolly, Hairy or Roulin's Tapir (*Tapirus roulini*), all of which names have been applied to the species represented by Panchita. This omission did not occur because the animal was unknown to Dr. Hornaday, but because its status was so uncertain and confused that, presumably, it did not appear to warrant inclusion.

The central theme of Dr. Hornaday's account

Besides her eagerness for an apple (held just out of reach), this picture shows "Panchita's" white lips, white ear-tips, and lightness of her head.



was the arrival, in 1923, of a young Baird's Tapir which, he states, was the first ever seen alive in this country. That was nearly 28 years ago and while Baird's Tapir is still not a common animal, it is represented at this moment in several American zoos, including our own.

Now, after 28 years, the Mountain Tapir, in the person of young Panchita, replaces Baird's as the rarest tapir in captivity. We cannot equal Dr. Hornaday's confident statement in regard to his Baird's and say that Panchita is the first Mountain Tapir to be seen alive in this country. But we *are* able to say that if there has been another, either here or in Europe, we do not know of it.

The Mountain Tapir has run an interesting course in the annals of zoology. In 1829, the great French naturalist, Cuvier, printed in *Annales des Sciences Naturelle* a report on a letter from M. Roulin, describing what appeared to be a new species of tapir, which he had discovered in the area of Bogota. The description given by M. Roulin checks very well against the external characters of Panchita, even to a bare space at each side of the rump, separated by a thin line of hair. A later author reported that he had been assured by natives that this hairless area was caused by abrasion incurred in sliding down the steep mountain sides!

In 1878, a tapir believed to be *Tapirus roulini* was received by the London Zoo and a drawing of it was reproduced in the *Proceedings* of the Zoological Society of that year. However, this drawing obviously is not representative of *roulini*, and in 1929 Major Flower[1] relegated it to the synonomy of the South American Tapir, thus invalidating the only captivity record for the Mountain Tapir that we have been able to find.

The status of the Mountain Tapir in museum collections is little better, very few institutions being so fortunate as to possess either skins or skeletons. Knowledge of the life habits of the animal is scant. It is known to exist in the Andes in both Colombia and Ecuador and there is a possibility that it may live also in northern Peru. It inhabits only the high cordillera and is said to range from 7,000 to 13,000 feet. When Charles Cordier was in the mountains northeast of Quito, above tree line at 14,000 feet, the natives pointed to a small projection of cover, saying they had once seen a black tapir there. With a range so difficult and a population so obviously sparse, it is easy to understand why collecting expeditions have repeatedly failed to find the Mountain Tapir. Also, why Panchita is numbered among our great rarities.

---

[1] List of the Vertebrate Animals Exhibited in the Gardens of the Zoological Society of London. Vol. I, Mammals.

These Photographs Settled It

General Curator Crandall was undecided about buying the tapir that was offered us in Ecuador until these three small photographs arrived, with the explanation that they had been taken in the native village of Borja, where "Panchita" had been hand-reared. It was obvious even in such tiny pictures that the animal's coat and the concave shape of its "face" were quite different from those of the rather common South American Tapir. Apparently both the Mountain and the South American Tapirs are found in the neighborhood of Borja.

Tiger Snakes and literally millions of frogs inhabit the lowlands of the Murray River. The trees are red gums, or eucalypts.

Photographs by the Author.

Where Venomous Snake Meets Carnivorous Frog

By DAVID FLEAY

IN THE RAINY SEASONS along the great waterway of the Murray River in Victoria, with its many overflows, billabongs and spreading swamps, venomous snakes and frogs are co-dwellers in teeming millions.

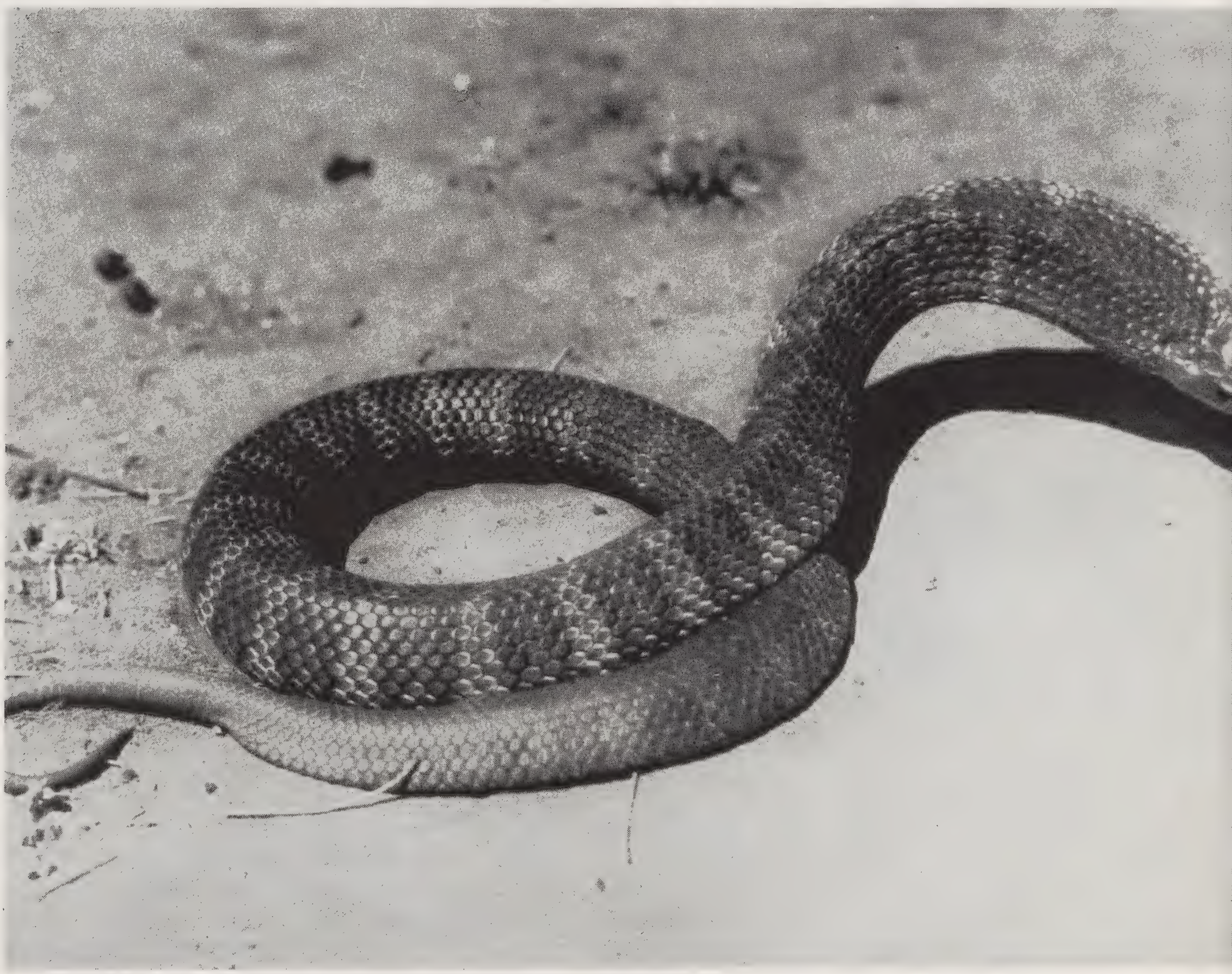
By day the frogs are seldom obvious except in the spring breeding time and then their roaring, booming chorus swells to a deafening symphony in the marshes and there are clammy amphibians overhead, underfoot and even in one's blankets. Usually only the turning of bark or fallen limbs, or the splitting of hollow logs, reveal their damp and safe retreats from the sun and the eyes of feathered stalkers. But at night they hop quietly

forth and sit with pop-eyes ever alert; their pulsating throats are the only sign of life in an otherwise sphinx-like pose as they wait to flick lightning-fast tongues at unwary insects.

The venomous Tiger Snake, *Notechis scutatus,* and the Black Snake, *Pseudechis porphyriacus,* of this region are dependent on the frogs for their food, and thus the drought years when the frogs shrink in number by estivating in the lowermost "basements" and failing to reproduce normally are reflected in the rapid dying out of vast numbers of snakes. A current example is provided by the famed Moira Lakes of the Murray River above Echuca, Victoria – once the dread of timorous duck shooters – which have not yet recovered in a "snake-sense" from the drought years of the late 1930's and early 1940's. Even today snakes are almost rare around those lakes.

Now it is definitely the common impression that the traffic between snakes and frogs is over a one-way road – with the frogs providing quick-lunch meals at the pleasure of the reptiles. However, there is plenty of evidence that the larger frogs, at least, do get a lot of their own back, for when new-born snakes are tender wrigglers their amphibious cousins quite often snap them up venom and all, and so turn the tables.

When I first saw frogs eating snakes in the Melbourne Zoological Gardens in 1935 my astonishment was immense – but after all, when one considers that frogs are notorious cannibals, often devouring one another, and taking such a variety of food as beetles, cockroaches and worms, why not a soft and tasty six-inch "snakeling?" It is not much different from a fat earthworm. Size is no handicap; in fact, the giant toads introduced into Queensland to deal with cane beetles actually relish mice, swallowing them piecemeal. When the millions of frogs emerge from cover after sundown to hop about in search of food, it is inter-



esting to note that small Tiger Snakes also move abroad in the warm darkness. Then they are safe from the keen eyes of snakelet-eating birds.

The frog that figures in the happenings described here is the Golden Bell Frog, *Hyla aurea.* This is the largest, most familiar and very common frog of southern Australia, with a head and body length up to three and a half inches. Though technically one of the tree frogs, it cannot be said to have any tree-living habits. Even the adhesive discs of its finger and toes are small. It is able to vary its color according to surroundings, changing within half an hour or less from bright green above, with noticeable golden streaks and spots, to a general dark brown. This is the frog which, when handed readily gives off an irritant secretion that causes indescribable pain if it is transferred from hand to eye by rubbing.

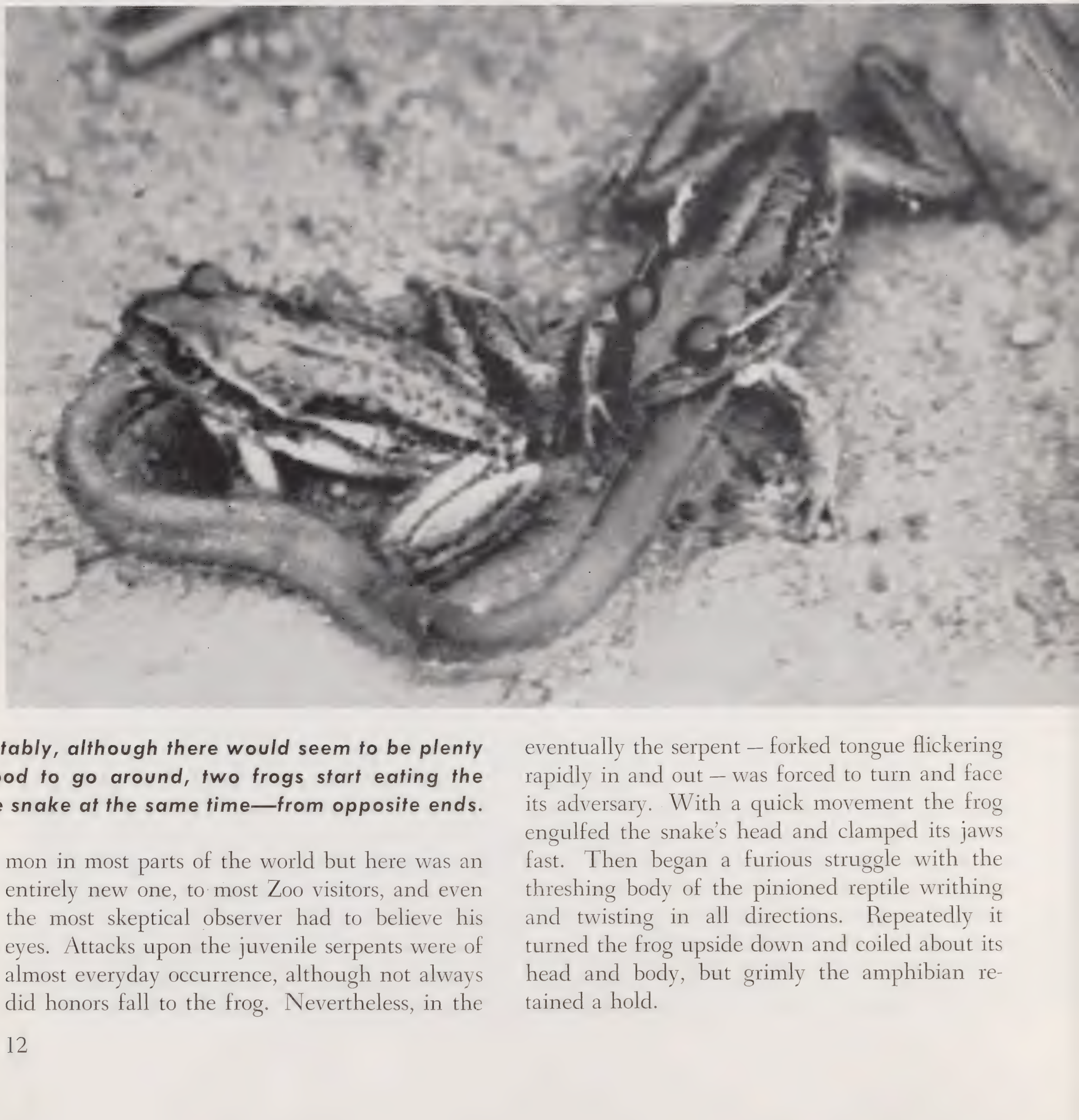
The Golden Bell Frog has a "cow-bell" voice and the ability to change color from green-and-gold to dark brown. It is the largest frog of southern Australia, with head and body length of 3½ inches.

Numbers of Golden Bell Frogs inhabited a moated and well-planted open air "grange" at the Melbourne Zoo in early 1935, and on this island with its rocks, hollow logs and small trees lived a hundred snakes which, unless hungry, dwelt in harmony with the frogs – just as in the Murray swamps, where the lifting of a shelter-log might disclose neatly curled reptiles sleeping peacefully alongside smug-looking frogs. There were anxious moments in the Zoo, of course, when two snakes happened to seize the same frog, for unless they were separated the larger reptile would certainly swallow not only the frog but its smaller colleague.

This adult Tiger Snake is in a bad temper and was on the point of attacking the photographer. Its flattened neck is a sign of its lethal intentions. The snake ordinarily preys largely on Golden Bell Frogs.

About the time this "grange" was established numerous families of baby snakes were born, mainly members of the Tiger species. They averaged 30 or more to each litter and with the arrival of the infant snakes troubles fell upon us. Kookaburras made unobtrusive but very business-like visits, departing time and again with small, wriggling snakes; Nankeen Night Herons arrived after dark and took both infant snakes and frogs; and – the most astounding thing to me – the Golden Bell Frogs displayed an appetite for the new-born Tiger Snakes.

Curious snake stories are by no means uncommon in most parts of the world but here was an entirely new one, to most Zoo visitors, and even the most skeptical observer had to believe his eyes. Attacks upon the juvenile serpents were of almost everyday occurrence, although not always did honors fall to the frog. Nevertheless, in the case of exceptionally big frogs and very small snakes the termination was a foregone conclusion. As an instance of an endurance contest there occurred one afternoon a classical duel of amazing duration. A lively young Copperheaded Snake eight and a half inches in length, glided out from cover for a late afternoon sun bath. It had partly shed its skin when it was spied by a small Golden Bell Frog two inches in length. Slowly and deliberately the big-eyed amphibian began to hop towards the young reptile. The snake sensed danger from this wet-skinned ogre and retreated, but its pursuer persisted in approaching and eventually the serpent – forked tongue flickering rapidly in and out – was forced to turn and face its adversary. With a quick movement the frog engulfed the snake's head and clamped its jaws fast. Then began a furious struggle with the threshing body of the pinioned reptile writhing and twisting in all directions. Repeatedly it turned the frog upside down and coiled about its head and body, but grimly the amphibian retained a hold.



Inevitably, although there would seem to be plenty of food to go around, two frogs start eating the same snake at the same time—from opposite ends.

Twenty-two hours after starting to swallow a baby Copperhead, the Golden Bell Frog still had two inches of tail to consume.

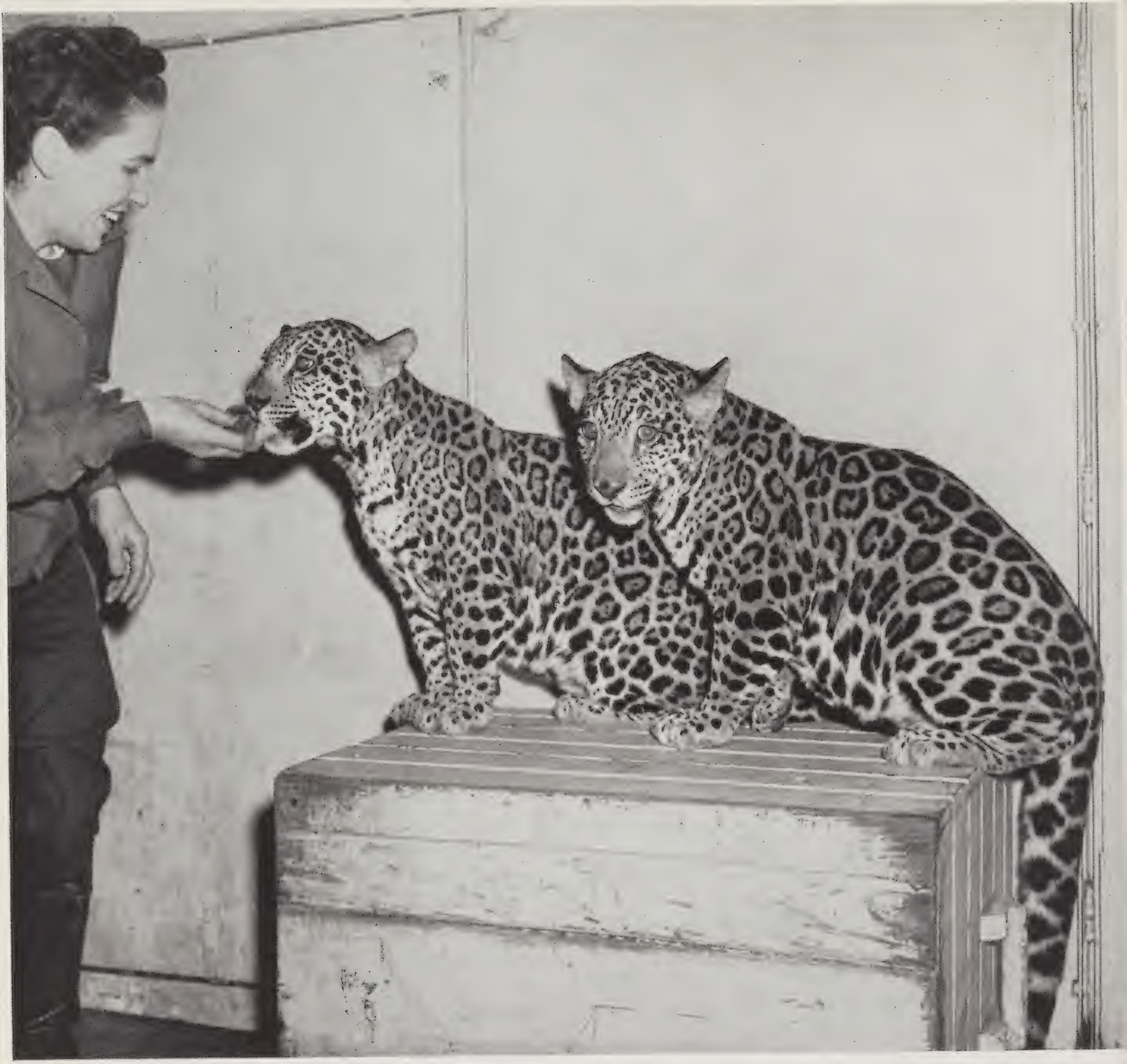
Each time the snake relaxed its struggles, the frog lost no time in jerking down a little more of its victim's body. Five hours later, at nine o'clock in the evening, a party which was being conducted through the Australian section of the Zoo by spotlight saw the frog squatting stoically in the self-same spot, hanging grimly to the half-swallowed victim, which had almost ceased to struggle.

The victor made little progress over night. Apparently an over-wrought stomach refused to speed up its functioning and by morning the now thoroughly dead snake still projected about two inches from the frog's jaws. In the afternoon, twenty-two hours after the commencement of the struggle, the frog was photographed with the final piece of tail just visible. Unmistakeable evidence of the snake's resting place showed in the bulge of the frog's abdomen and the victor was more pop-eyed than ever!

In a state of nature everything would have been all right from this point on, but human beings interfered and, as often happens, upset nature's program. I picked up the overloaded frog and posed it for a picture with the tip of its victim's tail still protruding. That was too much for the frog. A venomous snake and a twenty-two hour struggle it accepted as routine, but not the attentions of a photographer, however gentle and careful. Internal disturbances of a violent nature were observed, and gradually more and more of the dead reptile's tail was regurgitated, with the frog actually helping the disgorgement with its fore-limbs. Within a few minutes, as we watched, that great swallowing feat was completely undone and reversed; nearly a whole day of hard work was brought to nought. Many times since have similar battles taken place, although I know of none that approaches this particular one in duration of time.

Complications of the frogs' meals are not always caused by photographers, either. I recall one incident in which two frogs attacked one little snake simultaneously from opposite ends. One clamped down on the head and the other grasped the wriggling tail, each swallowing until at last their jaws met in the middle of the victim. Here they meditated over the problem for an hour or two until the more energetic frog made up its mind and wrested the prize from the other. Undoubtedly captive conditions accelerated some of the instances cited here but I have come across many examples since, particularly among the thick vegetation growing in the snake park at the Sir Colin Mackenzie Reserve at Healesville.

Australia is one place where the old and popular story of snakes swallowing their young may be witnessed – but not, perhaps, in quite the way that some bushmen would have us believe such things take place! Adult snakes may occasionally overtake frogs which have dined wisely enough, but too well, on small snakes, and being made sluggish by the enormity of their meal, the amphibians fall easy prey to the big reptiles. Thus many a mother snake may have unwittingly avenged the "baby-snatching" by swallowing both a frog and her own young one at the same time. That, I would say, is about the only way the fable of infanticide by snakes could ever become fact.



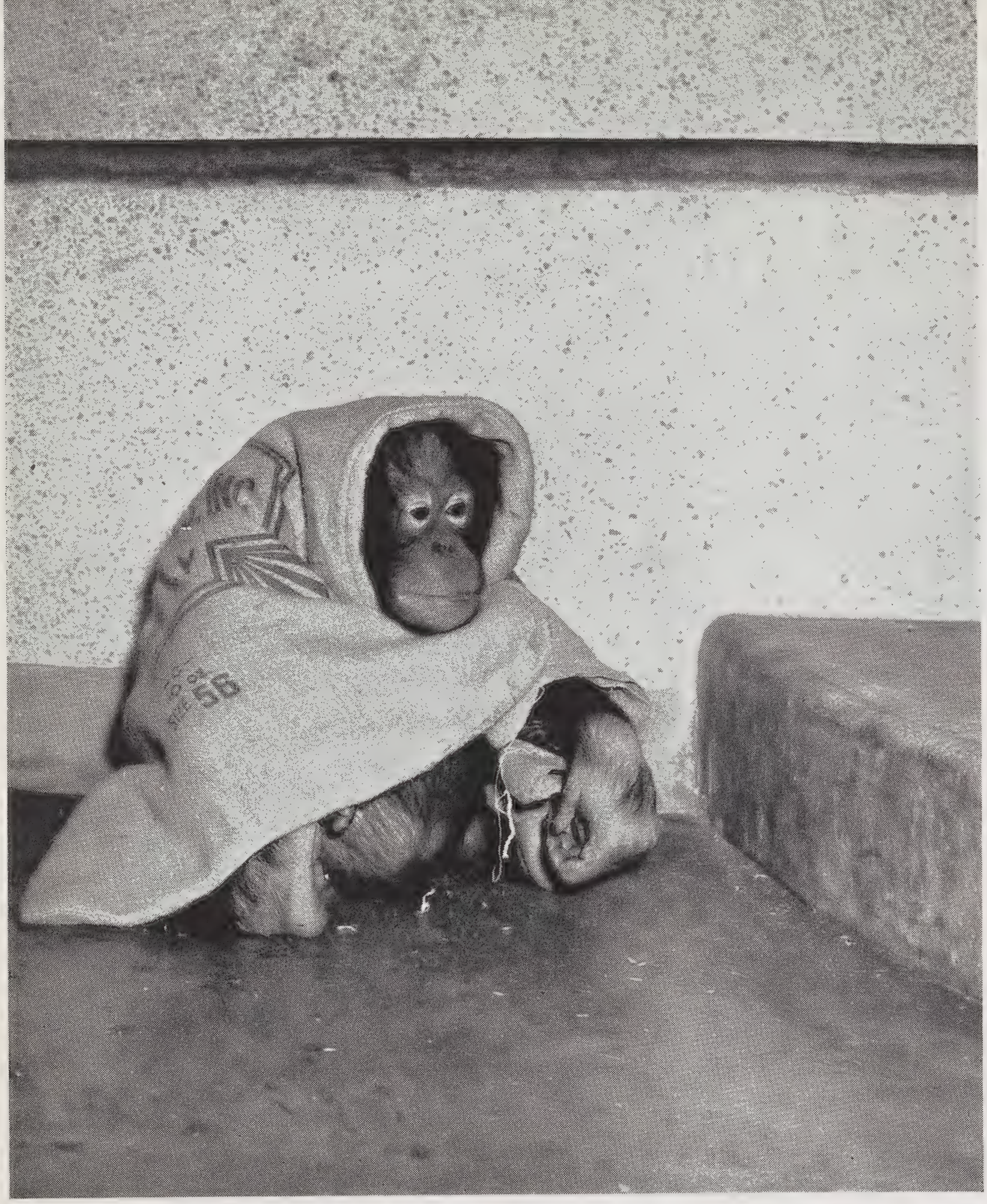
JUST RECENTLY ON EXHIBITION, AND CERTAIN TO BE FAVORITES — TWO NEW JAGUAR CUBS IN THE NURSERY.

New Pictures

Recent Work of

Staff Photographer Sam Dunton

A YOUNG EUROPEAN HARBOR SEAL
CAME TO US BY AIR FROM DENMARK.

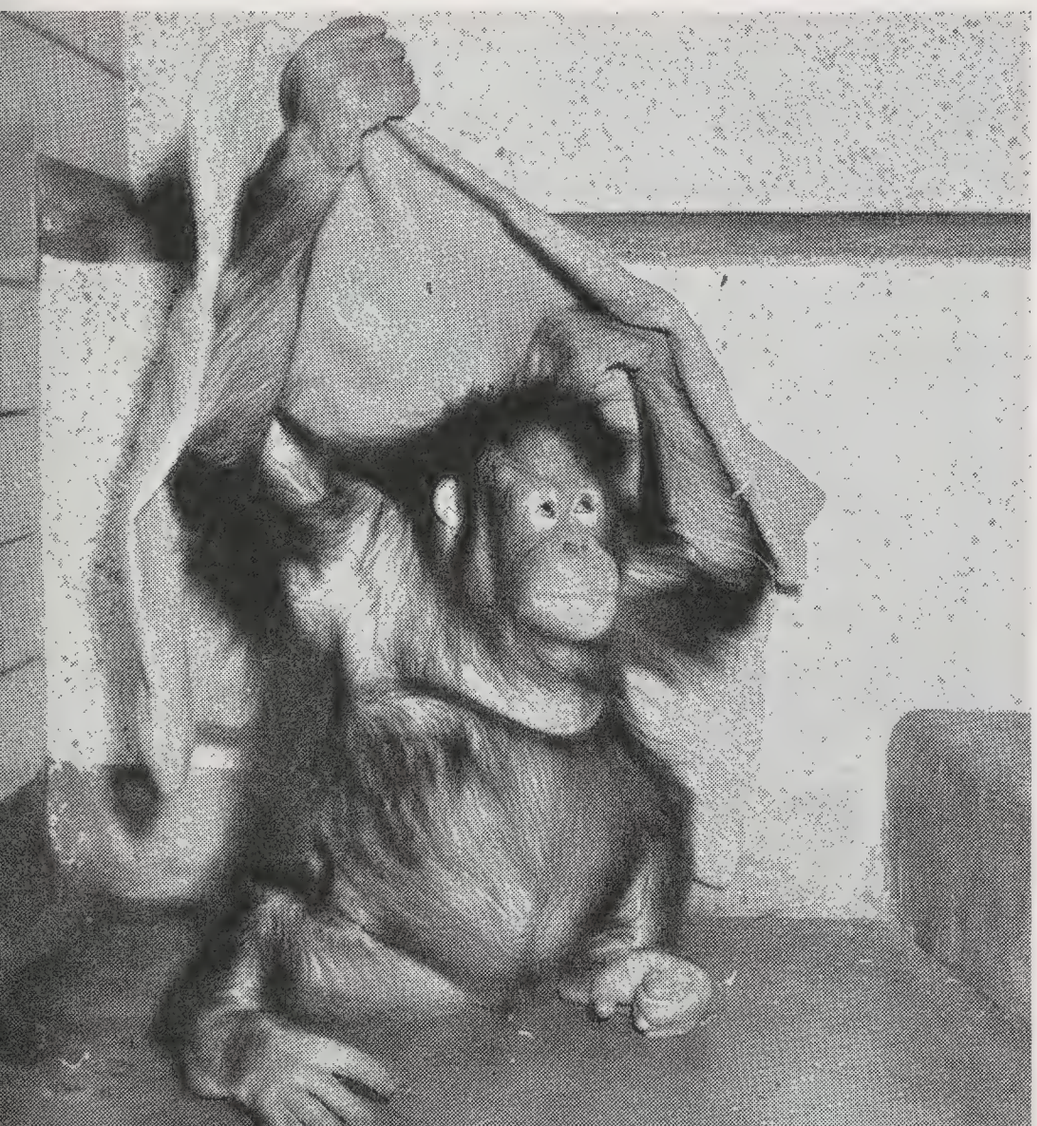


1 ANDY, OUR YOUNG ORANG-UTAN, HAS A WONDERFUL PLAYTHING—AN OLD SACK.

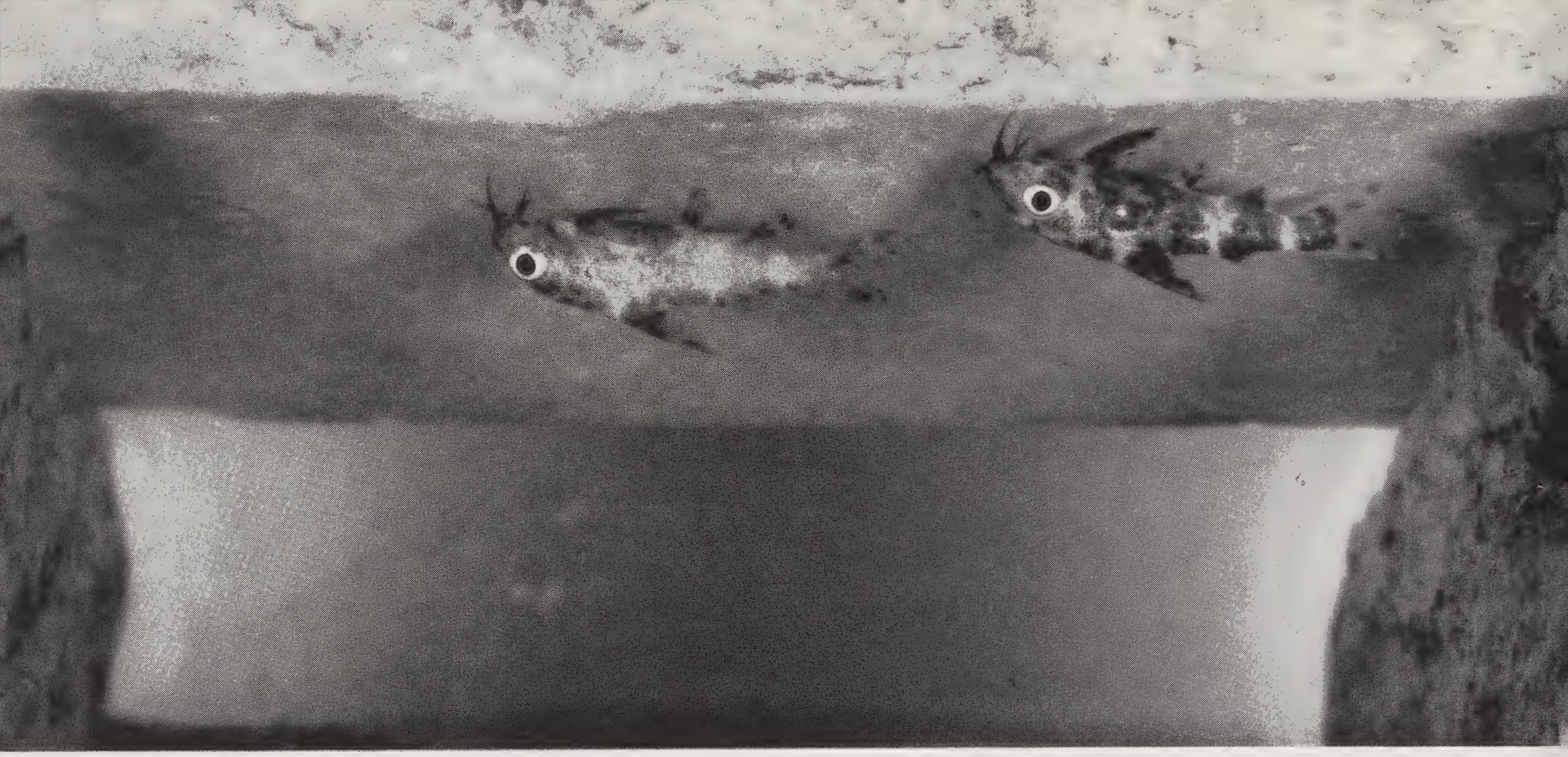
3 ANDY KNOWS VERY WELL THERE'S AN OPEN END TO THAT SACK.

4 THE BIG TROUBLE IS — JUST WHICH END IS THE OPEN ONE?

2 AND THEN, SUDDENLY, HE GETS THE GLIMMERING OF A NEW IDEA.



5 AFTER A LITTLE FUMBLING HE FINDS IT — AND HE'S INSIDE.



It Swims . . .

Upside Down

By JAMES W. ATZ

IN THIS AGE OF MIRACLES, there is a tendency for all of us to become blasé about the multiplicity of marvels. And naturalists are no exception; so many amazing biological facts are reported each year that we are always in danger of being surfeited with wonders. Perhaps that is why the existence of fish that swim upside down had never especially excited the Aquarium's staff, although we always hoped to obtain some for our collections. "Upside Down Catfish" from the Congo finally appeared last September on the lists of one of the larger tropical fish dealers, and naturally we purchased a few. Catfishes of this type were imported into Germany before the War, but this was apparently the first time they had been brought to the United States. Nevertheless, we were still pretty casual about the whole business.

Nor did our first look at the fish dispel this casual attitude. They were small, a little more than an inch and a quarter long, and of a nondescript dark brownish hue. From their general appearance they certainly seemed to belong to the group of catfishes which contains those species reported to swim in a reversed position, but they were huddled in the corners of their tank, behaving exactly the way almost any frightened catfish would. We knew that there are species in the group that do not swim upside down and thought that perhaps these fish were of that kind.

The newcomers were duly placed on exhibition and a day or so later we noticed a couple of them moving about their small aquarium. They were evidently feeling more at home and had lost some of their shyness. They were swimming along the bottom and up and down the sides of the tank, exploring their new environment by using their barbels or "whiskers" as catfishes are wont to do. Then one that was swimming up the side of the tank suddenly launched itself into midwater, by means of a maneuver aeronautically known as a loop, and leisurely swam across the tank on its back! On reaching the other side, it slid under a leaf of an aquatic plant and rested there, still upside down. From then on we could no longer take our upside down catfish casually.

We soon discovered that our catfish spent considerably more time in an inverted position than they did in an upright one. The remarkableness of this is apparent when it is realized that such a position in midwater is taken by other fishes only when sick or dead. In fact, most fishes never voluntarily turn upside down. A few lay adhesive eggs on the underside of stones and other submerged objects and therefore must turn over in order to spawn; thus we have watched a male Johnny Darter remain inverted for as long as eight minutes at a stretch while cleaning the eggs placed on the roof of his nest. Once in a while *Plecostomus,* an armored catfish from South and Central America, swims in a reversed position at the surface of the water. But only the upside down catfishes regularly swim belly uppermost. Human-wise, it is as if there were a race of men who habitually walked on their hands.

Our new catfish can and do occasionally swim right side up, but this seems to be a slight effort for them. The only times we have seen them resting with all their fins motionless was when they floated freely, belly uppermost, at the surface, or when the belly was lightly pressed against the underside of a stone. Although they do not have a sucking mouth or fins with which to hold themselves, they remain suspended immediately under the stone "bridge" in their tank for long periods of time without making the slightest apparent effort to stay there. Close observation revealed that the fish have practically the same specific gravity as water, being just a trifle lighter —that is, they just barely float. Flesh and blood are heavier than water, but each fish is equipped with a gas-filled swim-bladder to lighten it. This organ is visible through the sides of the body at a spot just below and in front of the dorsal fin. Most fish are able to regulate the amount of gas in their swim-bladder and thus can attain a nice adjustment with the surrounding medium—which it appears our catfish can do. Evidently upside down catfish are in stable equilibrium only when inverted; yet ours seem able to maintain themselves right side up, too, with very little trouble.

During slow upside down swimming, the tail and paired belly fins (pelvics) are mostly used. The upper and lower lobes of the forked tail are alternately swung from side to side, resulting in a sort of sculling action, while the pelvics are gently paddled back and forth. The other fins are employed only occasionally.

The upside down catfishes belong to the genus *Synodontis* of the family Mochocidae. More than three dozen different species have been described in this genus, all of them from the warm freshwaters of Africa. We have been able to find records of only five of them having been seen swimming on their backs, however. Our species is reported to be *Synodontis nigriventris* and if so, makes the sixth in which this peculiar habit has been observed. Some members of the genus become 18 inches long; how large our obviously baby specimens will grow we can only guess.

In nature synodontid catfishes feed on a variety of both plant and animal substances, and this omnivorousness is apparently reflected in their feeding habits in captivity. Our specimens have eaten the ordinary, dry, powdered fish food, the minced, raw meat-and-fish mixture we specially prepare, and also tubifex worms (small, freshwater relatives of the earthworm) and daphnia (small freshwater relatives of the lobster). The mouth is on the undersurface of the head and when the fish swims at the surface it can readily be used to gather in powdered fish food floating there. Feeding is more usually accomplished, however, while swimming upright over the gravel and rocks in the tank. During this operation the rather elaborate whiskers evidently come into play. The fish have three pairs, two of them with numerous side branches.

As in most catfishes, the head is protected by heavy bone and there is a stout spine at the front

of the dorsal fin and each of the two pectoral fins. The pectoral spines fit into joints in such a way that they can be locked in a position at right angles to the long axis of the fish. Native lore has it that this device prevents *Synodontis* from being swallowed by crocodiles, and, indeed, large Nile Perch have been washed ashore, dead, with one of these catfish stuck in the throat. The large synodontid catfishes make a grunting or squeaking noise when removed from the water. This is believed to be caused by the pectoral spines moving inside their joints. We have tested our fish, netting them out of the water and listening to them, but they make no audible sound, probably because they are so small.

Certain species of *Synodontis* have interested evolutionists because they represent one of the notable exceptions proving the rule of protective coloration. Most fishes are colored darker on their backs than on their bellies. This is called countershading and its effect is visually to flatten out the surface of the creature, making it blend into the background behind it. Moreover, a predator approaching a fish from below sees its white underparts less conspicuously against the light sky, while a predator looking down into the water from above sees the darker back against the bottom. There are quite a few fish not exhibiting countershading, but a large number do show it to a greater or less degree. What about the upside down catfishes which keep their bellies upward while they swim? Three of these species show an exact reversal of the usual gradation of pigment; their bellies are colored dark and their backs are light. The weight of this striking confirmation of one of nature's laws is somewhat diminished, however, when it is realized that two other species of *Synodontis,* known to swim on their backs, have light-colored bellies. At present our specimens bring no evidence to bear on this question, since they are too young and show only a juvenile pattern of light and dark patches and blotches. Whether they will eventually assume the inverse color pattern remains to be seen. At this stage their bellies are just as pigmented as their sides and back — an unusual state of affairs which perhaps indicates what is to come.

No one has yet proposed a satisfactory explanation as to *how* or *why* the upside down catfishes got that way. We can only speculate on whether the habit was just an evolutionary accident or was adopted to meet some special condition of the environment. The briefly reported observations of three French investigators may have some bearing on these questions. They found that young *Synodontis batensoda* swam normally during the early stages of their life. As they grew older they turned over more and more until they came to spend all their time upside down. The fish seemed to resist this change, struggling to keep right side up, but becoming progressively less able to do so. These scientists believe that changes in the fish's swim-bladder were responsible because this organ was seen to be much larger and to be placed lower in the body in *S. batensoda* when compared with another species of *Synodontis* which does not swim upside down. Whether the species we now have on exhibition ever passed through such a period of struggling against itself, so to speak, we do not know; present

The ancient Egyptians recognized the peculiarities of the "Upside Down" fish. An easily identified representation may be seen in the lower left-hand corner.

From Kellaway, after Gaillard.

What appears to be the floor of the tank in the photograph on Page 18 is here shown to be merely an "underwater roof" of stone; the upside-down position of the fish is obvious.

behavior of our specimens certainly gives no indication of it. As well as can be determined, they seem perfectly at ease when either resting or swimming belly uppermost, and, as mentioned before, can turn right side up with very little apparent effort, even changing from upside down to right side up and back again to their original position in the course of a single trip across their small tank.

Although these fishes have been recognized since ancient times – the Egyptians unmistakably pictured them, swimming upside down, on some of their friezes – we still do not know the most fundamental things about their natural history, such as how they reproduce, how fast they grow or what creatures are their enemies. Preliminary experiments by M. Jacques Daget indicated that neither the incidence of the light nor the aeration of the water influences their locomotor behavior, but more work along these lines is necessary. No detailed study has yet been done on their anatomy. Do they have a peculiar brain and is their circulatory system modified? What about that swim-bladder and their center of gravity?

Evolutionists, ecologists, behaviorists, physiologists and anatomists could all profit by a careful study of the fishes that swim upside down.

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CAREERS FOR YOUNG PEOPLE IN CONSERVATION

By SAMUEL H. ORDWAY, JR.

THERE ARE CAREER JOBS available for trained conservationists today and there are an ever increasing number of young people eager to make conservation a career. A good many of them as yet lack adequate training and understanding of the disciplines required to secure employment.

This situation, I am sure, will greatly change in the next ten years. A tremendous conservation job has got to be done if the productivity of the earth is to be built up and sustained to meet the demand of increasing populations for goods and of industry for raw materials. The downward spiral of resource depletion must be stopped, through a blending of the processes of nature and science, if we are to increase productivity as well as production. This will require a great many career jobs, and a great many trained career planners, managers and technicians.

Career opportunities are not all in government service. Henry Frazer of automotive fame recently concluded that it is wicked to burn, destroy or dump into the sea the waste organic matter of tobacco-stalks, garbage and urban sewage when it is so greatly needed to restore the fertility man is daily drawing from the earth. He employed organic chemists, soil scientists and engineers and built a pilot plant to transform such wasted materials into "Pay Dirt," a dry, odorless, organic fertilizer which he is selling at cost now, and can soon sell at a profit if he cares to do so.

With the same thought in mind, the city of Milwaukee is turning its sludge into "Milorganite," another valuable product designed to restore to Mother Earth some of her lost riches.

Sulphurous wastes of pulp manufacture, which have long polluted the streams of many lands, are now being converted into sugar by some of the more enterprising paper manufacturers here and abroad.

But industrial waste has not been stopped. In fact it continues to increase. These few examples of waste utilization are merely indications of the awakening of modern man to his problem of salvation on a badly plundered planet. In time, thousands of other examples will follow, and they will require additional career jobs and workers trained to translate their technical knowledge into applied conservation of the earth's resources.

Not all of the technical and management problems which have to be solved are man-made. A recent report of the New York State Conservation Department discloses that the oyster beds, and indeed all of the shell fisheries, around Long Island will have to be closed temporarily, not on account of human and industrial wastes, but because of pollution caused by the intensive rearing of domesticated ducks on Long Island. This problem obviously calls for technicians, trained perhaps in animal husbandry, marine biology, chemistry, economics and sociology. The by-product of duck-farming, properly salvaged and utilized, might become, like guano, more valuable than ducks and oysters combined.

Quite as important to the future of conservation as careers and trained workers, is an informed citizenry. Man must know enough and care enough about his relation to renewable resources to enable him to strive intelligently to prevent the wasting and consuming of resource capital faster than it can reproduce itself. This will require increased attention from the educational process of our time. As such knowledge grows there will follow more ample planning, more competent management of resources—and additional careers for trained conservationists.

One discouraging note is the voice of a small group of scientists today who delight in insisting that man is discovering sufficient new ways to increase production and to synthesize food so that there need be no fear for the future. This group might be called the Cornucopia School of Science. It fails to recognize that increased production brought about by hybrid seeds or other forcing methods creates additional drain upon the land's fertility, and that every synthetic food yet found—whether made from sawdust or seaweed—must have an organic base capable of reproduction. The faster our consumption of living things, the more trained conservationists we shall need to sustain productivity.

Let us look at the kind of jobs which are available today and some of the problems which have to be solved. Then let us consider what

Forestry has many specialized jobs. In addition to timber cruisers who measure growth and stands, there are opportunities for entomologists, silviculturists, fire wardens and spotters, and a great many others.

kind of training is likely to fit young people for careers in conservation, and what kind of training is available.

Today the U. S. Soil Conservation Service employs about 8,500 technicians trained to consult with farmers and advise them on the best methods of using each of the various sections of their land, and on methods of fertilizing, planting and cultivating to reduce waste and increase both production and productivity. Our state agricultural college, experiment stations and state extension services are training and employing soil analysist and agronomists in increasing numbers to meet increasing demands for service from farmers who are becoming better informed each year as to the need for competent conservation information.

Jobs in range management involve studies of soil conditions, the nutritive value of various forms of grass cover, the supply of water, the struggle against erosion, the effect of pests and disease on cattle as well as plants, and most of the other problems of land and forest management and animal husbandry as well. One constant problem is to determine the most economical "carrying capacity" of a particular range in a particular season. Too many cattle grazing in a dry season will not only injure the grass cover, perhaps permanently, but will produce lean cattle of less market value than fewer head of fat stock. How many head should be grazed on a particular range? And under what conditions are five sheep equal to one steer?

At the recent annual North American Wildlife Conference more than 1,000 individuals, many of them young, met in Washington to discuss the many unsolved problems in the field of wildlife management. All of these thousand individuals are engaged in careers of conservation of wildlife. Many of them are employed by State Fish and Game Commissions. Others are employed in the management of privately owned wildlife areas. Others are engaged in teaching wildlife management, carrying on research for private organizations or writing for outdoor journals.

Wildlife technicians require a deal of common sense as well as knowledge of animals and their behavior. What does it take to find a way to control the water level of ponds dammed by beaver so that the raised waters will not kill off surrounding trees? Can water levels be controlled without killing or driving out the beavers, which rebuild their dams as fast as the dams are destroyed? Inserting an iron pipe through the dam at the desired level does not do the trick because the beavers plug up the mouth of the pipe with mud and brush. It was only last year that a wildlife technician found a cheap and easy way to keep such ponds at the desired level. He used a fibre pipe, easily transported, and bored holes all along its sides. The beavers plugged the mouth of the pipe, but action of the flowing water prevented them from plugging the holes in the rounded surface of the pipe!

What sort of problems confront our fish technicians? There are many related to the life, habits and environment of both salt and fresh water fish of which we know all too little. Consider the problem of saving the Pacific salmon blocked from their spawning grounds by power dams on our western rivers. The problem was not wholly solved by devising fish ladders and fish elevators which enable the salmon to surmount these dams. The problem of how to get the young fish downstream to the sea again remained unsolved. Thousands of young salmon are killed each year

Wildlife technicians need common sense as well as specialized training. It was just practical how-to-do-it sense that enabled one technician to discover how to control water level behind a beaver dam.

on the downstream migration because they can not survive either the sudden drop over the high spillway or the grinding action of the turbines into which they are frequently drawn. The fish will not go down the ladders their parents ascended, and no way has been found to lead or direct them into those narrow "escapeways" thoughtfully provided by the nature-loving Army Engineers. Screens and nets are destroyed by debris in flood time. U. S. Fish and Wildlife Service research workers are still experimenting with underwater light and underwater electrical impulses in the hope of steering these fish away from danger and into the escapeways.

Reports from the commercial fishery centers, the Pacific Northwest, the Gulf of Mexico and the North Atlantic, indicate that there is a dearth

of knowledge and a dearth of technicians today capable of carrying on specialized studies of the habits and production of marine resources. The U. S. Fish and Wildlife Service is urging the establishment of additional training centers for fishery technicians; most of the work in this field is highly specialized in character.

In the field of Forestry additional opportunities for trained Foresters are opening, as state after state recognizes that the dwindling resource of farm woodlots and other small holdings will not be scientifically utilized until technical advice is furnished on the land to owners. Groups of cooperating farmers and small woodland owners, in various parts of the country, are beginning to employ, on a cooperative basis, trained Foresters to advise them with reference to planting and cropping of their trees. The schools of Forestry throughout the United States which have been in operation for many years are turning out foresters today as fast as jobs can be found for them.

In forestry, too, there are jobs which require a variety of training and techniques. In addition to the recognized tasks of the cruisers, who measure timber growth and stands, research workers who measure water run-off under varying conditions and soil, slope and forest cover, the silviculturists who study the suitability of species to environment, the entomologists who fight pests and disease, and the fire wardens, spotters and fighters, there are numbers of other specialized tasks to be performed. As a single example of the kind of forest task few people know of, weather forecasters are engaged by most progressive lumber operators today to predict wet and dry periods in advance to enable management to concentrate or disperse its army of woodsmen on the basis of fire danger, which is affected by daily changes in the weather.

In view of the limited number of career opportunities presently available in conservation it is encouraging to know that State and Federal Planning Agencies have recently begun to recognize the *need* for additional technicians and planners, which means additional conservation careers in public service. At the present time, as Fairfield Osborn pointed out in OUR PLUNDERED PLANET, appropriations of the Federal Government towards conservation purposes of every nature are less than 1% of the national annual budget.

Even more encouraging to those who feel that conservation is more the business of individual owners than a problem of expanding government, is the fact that many of the largest industrial owners and users of resources are today expanding their staffs of conservation technicians. Private timber owners are employing more trained foresters than ever before. And it is a fact that private banks and insurance companies, concerned with farm mortgages and loans to improve land usage, today employ more land-use technicians than

Progressive lumber operators keep a careful eye on the weather and particularly the general humidity, for they know that a dry spell increases the danger of fire. Here a humidity gauge is being examined.

State and County Governments combined and are expanding these staffs.

I have said that there are not as many careers open in the various fields of conservation work as are needed to do what needs to be done, or to take care of the many young people who would like such careers. By the same token, it is true that there are not now nearly enough individuals adequately prepared to do what needs to be done.

It is encouraging to see the great increase of interest in the teaching of conservation in the schools and colleges of this country which has occurred in the last two years.

A recent survey of thirty leading colleges and universities conducted by the New York *Times* discloses that the vast field of conservation, with its complex relationships of soil, water, animal, plant and human resources, "is just beginning to come into its own."

Thus it appears that opportunities for training in the field of conservation are increasing while the number of careers open to trained individuals is increasing also.

Let us consider then the nature of training best calculated to fit young people for the several careers in conservation which *may* open to them.

Specialized courses in soil science and in forestry are of course available in agricultural and forestry schools in all parts of the country. Many of these specialized courses, however necessary to equip a technician, are inadequate to the broader needs of today. There is increasing recognition of the fact that our basic resources of soil, water, plant and animal life, are all dependent one on the other. The wise management and use of any resource requires through understanding of the nature and proper usage of each other interdependent resource. Therefore, it is important for any prospective career conservationist to secure a thorough grounding in a large number of fields of study. What studies are basic?

Comprehension of modern geography, the relationship of life to its environment, is certainly a prerequisite of thorough preparation. Plant and animal ecology, study of the relationship of communities of plants and animals to all of the natural forces which effect their development, is also essential background knowledge. Human ecology, which is the very essence of History, discloses the manner by which civilizations rise and fall by reason of abundance and dissipation of resources. History of warfare is largely a record of the struggle of overpopulated, undersupplied nations for greener pastures. So, also, studies in demography and sociology reflect upon the instability of rising populations dependent upon limited renewable resources, and the effect of cultural systems upon social attitudes toward nature, exploitations and population growth.

Broad understanding in such areas is a desirable prelude to study of the structure of the earth's surface and the nature of the biosphere. Here, the training of the prospective conservationist becomes scientific as well as cultural. Knowledge of organic chemistry, geology, zoology, botany, entomology, ichthyology and hydrology are basic to more specialized and technical studies. The student may well want to acquire a

working knowledge of climatology, oceanography or limnology, and genetics before he plunges into graduate specialization in one or more of the applicable sciences relating to the management of soils, forests, fisheries, wildlife, watersheds or reclamation.

Opportunities to major in courses of this type in preparation for a career in conservation are available at the present time in many parts of the country. Stanford, Wisconsin, Michigan, Illinois, Cornell and Yale are among the institutions disclosed by the *Times* survey to have established provision for such an overall conservation training and there are many others offering more limited programs.

But academic study alone will not provide adequate training for employment. It is necessary to combine such learning with observation and study on the land itself. For example, along with the unique course of study leading to a Master's Degree in the Conservation and Utilization of Natural Resources at Yale, is a proposed laboratory project calling for the study of interrelated factors of resource use on the entire watershed of the Connecticut River Valley. This project provides for field studies of watershed forests not only as a source of lumber and pulp through the years but in relation to water production and control, erosion and siltation, and wildlife habitat. So, also, it provides for field studies of the agriculture of the watershed, including the effect of cropping methods and customs on the land itself and on the economy of the region. This project also affords opportunity to observe and study on a single watershed such items as the history of fisheries, the effect of pollution, creation of dams and power, the destruction of wildlife and industrial development upon the economic and cultural life of the valley community.

Beyond the broad laboratory experience implicit to this kind of directed field study, there are practical opportunities for the student tc acquire essential training as an apprentice to working conservation technicians. For example, each year the U. S. Civil Service Commission announces an examination for Student Trainee (Soil Conservation or Agricultural Engineer) and also for the position of Conservation Aid. These examinations are open to undergraduate students of accredited colleges or universities who are pursuing major study in biology, botany, forestry, soil conservation, agricultural engineering or animal husbandry. Appointments as trainee or aid are made for the summer months to subprofessional positions in the Soil Conservation Service in the various states. The positions pay from $190 to $227 a month and may lead to permanent appointment in the Federal service after completion of academic courses for professional careers; such *careers* start at $2,974 a year.

Open competitive examinations for positions in the United States Forest Service running all the way from Fire Prevention Aid and Lookout, to Timberman and Researcher, are held every few years for qualified graduates of Schools of Forestry. Positions such as Range and Forest Ecologist, Forest Pathologist, Silviculturist and Forester are open at salaries which range from $3,397 to $7,102 a year. There are also positions as Junior Agricultural Assistant available, beginning at $2,974 a year, to graduates of accredited colleges who do not have post-graduate degrees. These include positions as Agricultural Economist, Aquatic Biologist, Geneticist, Plant Pathologist, Entomologist, Wildlife Biologist and Zoologist.

The fact that such positions exist does not mean that there are enough career jobs available to assure the employment of all applicants who meet minimum educational requirements. It is probable that with the increased public interest in conservation as a career, the number of young people who will complete such minimum educational work will keep pace with the expected increase in openings in the Government Service.

The field of conservation work should be highly competitive. With increased specialization it will become ever more desirable for employers to select, from increasing numbers of applicants, those who possess a broad social and philosophical understanding of resource interdependence as well as adequate specialization in a particular discipline. It will be from the individuals so selected that a high order of future conservation planning and resource management will come. Such broadly trained career workers will have it in their power to produce abundance, from scarcity, for generations to come.

News from the Conservation Foundation

Water Problems in the Foreground

The Conservation Foundation's research activity in the field of water, its availability and use, has already borne fruit in the form of two published reports.

"Water in Industry," the first of the two off the press, is the summary of a survey conducted jointly by the research staff of the Foundation and staff members of the National Association of Manufacturers. Information and charts in this book are based on several thousand questionnaires completed by members of the N.A.M. and covering basic questions on the subject of water use throughout all types of industrial consumption. The range and importance of N.A.M. membership give this publication a unique value in its field. The work will have free distribution to all Association members, to various Chambers of Commerce and to selected water works engineers. This book was ready for distribution at the time of the N.A.M. convention in mid-December.

In mid-April McGraw-Hill expects to publish "Conservation of Ground Water" by Dr. Harold E. Thomas, based on the work in the field of ground-water resources completed by the author and the Conservation Foundation's research staff during the last two years. The final summary chapter of this book was prepared by Dr. Abel Wolman of Johns Hopkins University, and Fairfield Osborn has written the foreword.

These are the first published results of the Foundation's research program, and make, we believe, valuable contributions to our knowledge of the nature of our water resources and of their use in industry – especially important data in time of emergency.

Stony Brook Watershed To Be Surveyed

As a "grass-roots" pilot study which may be of great value in planning future land-use research projects, the Stony Brook Watershed project in Mercer County, New Jersey, promises to be among the more interesting and important undertakings of the Foundation's Research Division. This watershed, centering in the Princeton area, influences land use over perhaps a typical central-Atlantic rural district. If the conservation needs for such an area can be defined for long-term practice it may well be that this project can produce the pattern for similar watershed handling not only throughout New Jersey but in other areas where comparable conditions prevail.

Several friends of the Foundation initiated and have supported the Stony Brook project, which is also of interest to the Princeton Garden Club. Under the Foundation's direction, Mr. John Barnard of the Philadelphia regional office of the Soil Conservation Service was appointed to make a survey of the Stony Brook Watershed project plan, beginning his work the week of January 8.

It is hoped that this work will point the way for conservation programs in other garden clubs.

Advisory Council Meets

Members of the Scientific Advisory Council of the Conservation Foundation met with the staff for an all-day conference on November 28. Over-the-desk meetings at Foundation headquarters were held during the morning with a more formal gathering in the afternoon for the purpose of considering proposals for further Foundation research. Discussion was resumed at dinner and during the evening when the latest Foundation films were shown. Great benefit will be derived from this contact with our advisors.

The following members of the Council attended: Robert C. Cook, American Genetic Association, Washington, D. C.; Harold J. Coolidge, National Research Council, Washington, D. C.; Caryl P. Haskins, Haskins Laboratories, New York City; G. Evelyn Hutchinson, Yale Univer-

sity, New Haven, Connecticut; and Carl O. Sauer, University of California, Berkeley, California. R. Tavernier also attended as Deputy for V. van Straelen, Director, Royal Museum of Natural History, Brussels.

"Living Water" Film Nears Completion

Cutting of footage for the Foundation's fourth series of educational films, the "Living Water" series, is progressing and the material will soon be ready for the next editorial step. A 300-foot preview was given Society Trustees at their dinner in December. This series is planned for 1951 release through Encyclopaedia Britannica Films Inc. Plans are also maturing for the Spanish and Portuguese sound-tracks for the Foundation's films already produced, these films to be for South American use.

Emergency Delays the Aquarium Project

Back into the Society's hope chest once more go our plans for the new Aquarium. The New York Board of Estimate approved our contract with the City last October 19. We proceeded at once to prepare our campaign to raise the Society's share of the building's cost. After slightly more than thirty days in the sun, this alluring project was regretfully returned to the mothballs by action of our Board of Trustees at their December meeting — a decision due to the conditions of the day.

In announcing this action to the Society at the annual members' meetings, President Osborn said: "A campaign for funds would be untimely, to say the least, and even though the funds became available construction would presumably become impossible due to shortages of manpower and materials. Consequently, we shall have to hold this great project in abeyance until better days come again."

The decision to postpone the Aquarium Fund campaign came a little too late to head off certain work that had been started in behalf of this great undertaking. Those who attended the meetings at the Waldorf on January 3 and 4 had a tiny preview of what the new Aquarium will be like. In the foyer of the ballroom we exhibited a model of the building and grounds, backed by three superb paintings showing some of the spectacular life we plan to have on exhibition.

The central one of the big canvases by Carl Burger illustrated the animals that will be seen some day in the huge outdoor tanks of the new Aquarium — Sea Elephants, Sea Lions, Penguins and Porpoises. Flanking it were a representation of great sharks and rays and a brilliant study of aquatic life around a coral reef. The model and these three paintings, shown against a deep blue background, were magnificently brought into key by the superb lighting arranged by Abe Feder, who volunteered his services for this occasion.

A campaign book about the new Aquarium was almost ready for printing when the November-December issue of Animal Kingdom went to press. Hence we advertised a limited number of the initial edition to help defray campaign costs. Regretfully again we have been obliged to write subscribers for this book telling them that it, too, has been postponed. A file is being kept of these subscribers' names. "If, as and when," they will be the first to know that the Aquarium book is at last available.

It is difficult to relinquish hope for an undertaking of such beauty and importance. There has been every indication that the community is eager for the restoration of the Aquarium. On the announcement that we had completed our contract with the City we received the best possible evidence of public support. Once more, to our sorrow, we have been obliged to say to these friends, "Not yet!"

This chapter in the erratic life of the new Aquarium should not be closed without some tribute to the philosophic patience of our Christopher Coates and his colleagues, Ross Nigrelli, Myron Gordon, James Atz and all the Old Aquarium staff members who have been waiting a decade for this fulfillment of their hopes.

So many of the plans for the Society have been realized in the last few years that it seems a certainty that some time — and not too far away — the new Aquarium will come true, too.

BEHIND THE SCENES

NEWS AND NOTES OF THE ZOOLOGICAL PARK, THE AQUARIUM AND THE DEPARTMENT OF TROPICAL RESEARCH

New Laboratory in Park to Study Adolescence in Electric Eel

A new biophysics laboratory has been established in the northeast corner of the old Primate House to investigate neuro-electrical problems in connection with the Electric Eel. Special apparatus, provided chiefly by the DeForest Grant Research Fund, will enable us to further certain enquiries, already well started, into the differences in nervous activity which seem to accompany the transition from adolescence to maturity in Electric Eels.

"Big Blow" Destroyed 402 Trees

Four hundred and two trees, of which 342 were more than 8 inches in diameter, were hurled down by the great windstorm of November 25. No animals were injured.

The most serious effects of the storm were to be seen around the Concourse Entrance, where five of the great elms planted in 1907 were destroyed. Two other elms lining the main entrance were lifted up and we fear their roots were severed, so that they will not survive.

The storm's havoc at the Main Gate.

Was the Platypus Ever Extinct? So Question House Explains

Now that Question House, the Zoological Park's information center about animal life, has closed for the winter, the staff is compiling its records of the past season and wondering what – if anything – was in the minds of some of the inquirers after zoological knowledge.

The prize question stemmed from a visitor who came directly to Question House from the Platypusary, a few yards away, where our two Duck-billed Platypuses were on exhibition. After discussing Platypuses intelligently for several minutes, the visitor asked: "Now, when was it that Platypuses became extinct?"

The staff explained that Platypuses never were extinct – else there wouldn't be two very lively ones in the Bronx Zoo. The visitor said: "Oh!"

Some other questions thrown at the Question House staff in recent months were:

Why can't storks whistle?
How old does an Elephant have to be before it has ears?
How can you tell when an animal has a headache?
What was the life span of *Tyranosaurus rex?*
Does a baby Hippopotamus have gills?
How many skins does an elephant have?
What is the purpose of Giraffes?

Altogether, Question House answered 13,970 inquiries directly, or by telephone or letter, in 1950.

In Praise of Our TV Show

Within two weeks after the Zoological Park's television show, "Saturday at the Zoo," closed on December 2, the Zoo received 3,370 letters and postcards urging a continuation of the program. Almost all the messages commented on the educational nature of the shows and many remarked that "such programs are what television needs,

instead of so many puppet, cowboy and blood-and-thunder programs." To date, no sponsor has been found who agrees with this verdict, however.

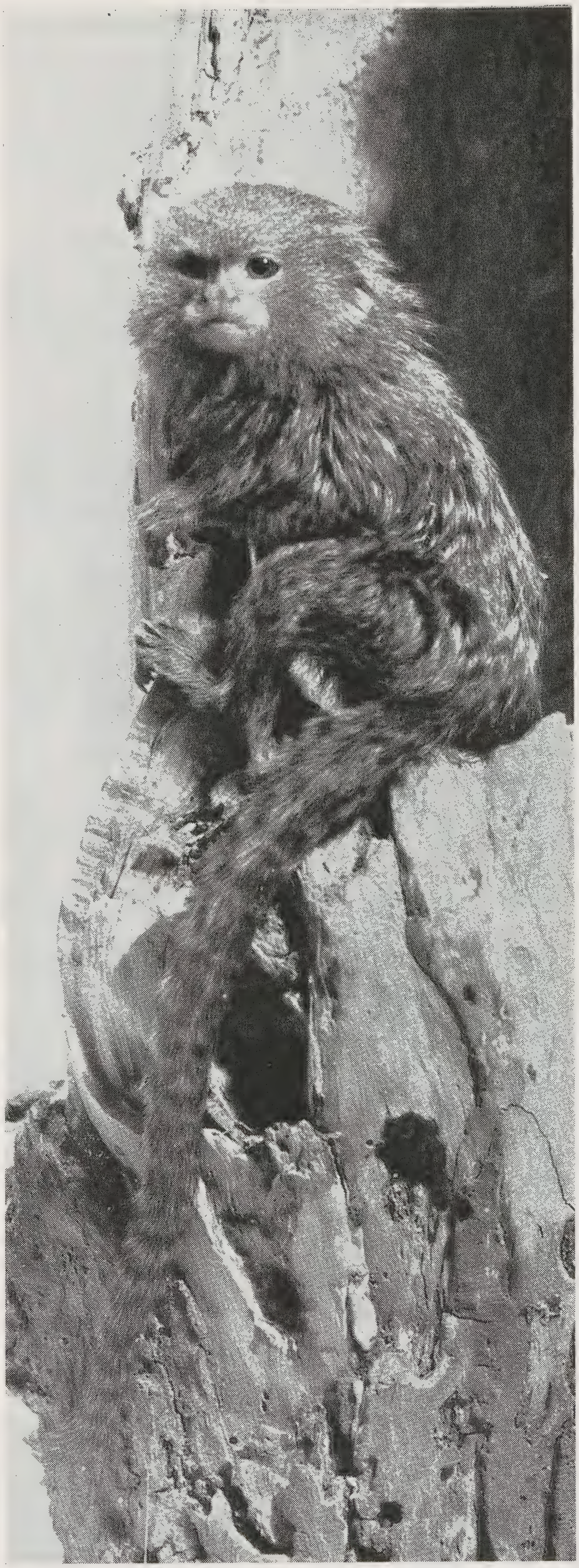
Department of Tropical Research Begins Its 49th Expedition

On January 19 the Forty-ninth Expedition of the Department of Tropical Research left New York on the SS *Alcoa-Pointer*. The ports of call of the steamer will include Bermuda, Virgin Islands, La Guaira, Guiria, Puerto Sangre, Caripito and finally Port-of-Spain, Trinidad.

The members of the staff leaving by steamer included William Beebe, Jocelyn Crane and Ellen Ordway. The others will follow later by Pan-American plane. These are Henry Fleming and John Cody, artist. Their trip will take only eight hours, without stop from New York to Trinidad.

One hundred and four pieces of luggage, cases and boxes were taken by steamer, including all the final equipment necessary to complete the Simla laboratory. In the transportation of this and in many other ways the Alcoa Steamship Company continued to give us most generous support. In our luggage were many instruments which are the gifts of sympathetic members of the Zoological Society.

On or about February 1 we will reopen Simla laboratory and begin our second year there. Part of our activities will be of a general nature, gathering for publication details of the environment in preparation for long term investigations. Our warmest wish is that, instead of reading descriptions and looking at our paintings and photographs, all interested members of the Society could see for themselves, at first hand, the beauty and the rare sights of the two hundred acres of wild jungle which are now at our disposal for scientific investigation.—W. B.



A Pigmy Marmoset from the headwaters of the Amazon is now at home in our Animal Nursery. This is the world's smallest monkey. Our specimen is young, but is almost full-grown.

A New Explanation of the Lymphocystis Disease

One of the most mysterious of fish diseases is lymphocystis, a condition characterized by peculiar growths, containing enormously enlarged cells, on the fins and body. Fishes, both freshwater and marine, from many parts of the world are known

to suffer from it, and in Europe and the Great Lakes it attacks considerable numbers of flounders and pikeperch, important food and gamefishes.

For years it was believed that this disease was caused by a virus. The evidence was circumstantial, but since none better was forthcoming this explanation was generally accepted.

Since 1937 Dr. Nigrelli, the Aquarium's Pathologist, has been studying lymphocystis. Quite recently he hit upon a new explanation for the disease, one which seems to fit the facts better than any other. Dr. Nigrelli discovered that the tremendously enlarged cells – once thought to be virus-induced – are identical with the eggs of certain copepod parasites. These small relatives of the crab and lobster live on the gills of fishes and are always found on individuals suffering from lymphocystis. Dr. Nigrelli reported on his findings to the American Society of Parasitologists at the AAAS meetings held recently in Cleveland.–J.W.A.

PUBLICATIONS OF INTEREST

DRAGONS IN AMBER. By Willy Ley. 328 pp., illus. The Viking Press, Inc., New York, 1951. $3.75.

Readers of Mr. Ley's previous book, "The Lungfish, the Dodo, and the Unicorn," will recall that he has an extraordinary knack for making the history of an animal – the stages of our knowledge of it – into a kind of running story that is accurate as well as lively. His new book contains fifteen chapters on subjects ranging from amber and the reconstruction of *Chirotherium barthi* from footprints through frozen mammoths, Pere David's Deer, the Giant Panda and the New Zealand Takahe to eels, ginko trees and Japanese Beetles. Reading them is a good deal like listening to a museum curator, with a thorough knowledge of the history of his specialty, spinning yarns among non-technical friends.

BIRD LIFE. By Edward A. Armstrong. Frontispiece in color, 24 photographs, 2 wash drawings and 45 text-figures, pp. 152—ix. Oxford University Press, New York, 1950. $2.50.

How birds live is a subject of wide general interest and one to which naturalists are devoting constantly increasing attention. In this little book, Mr. Armstrong has compressed a vast amount of material into relatively few pages. There are sixteen chapters, each devoted to a special subject and treated with an admirable economy of words. Little that is new is included, but, as in the author's "Bird Display and Behaviour," much of the knowledge already gained is carefully summarized. The illustrations have been drawn or selected for their usefulness in supporting the text. L.S.C.

New Members of the New York Zoological Society

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YOUR SOCIETY

Needs your help!

We need more Members.

We need more people who have a keen interest in the Zoological Society's program of Conservation, Education and Research, who want to have a share in the important and exciting things we are planning and doing.

Everyone who loves Nature, everyone who is conscious of our national need for conservation, is a potential Member of the New York Zoological Society.

By these tests many of your friends must qualify. Won't you serve your Society by calling the desirability of Membership to their attention? They and you will gain in Society services as the Membership grows—to say nothing of the stimulation of participation in the Society's activities.

A simple postcard addressed to the Membership Department at the Zoological Park (New York 60) will bring you full information about the Society's program to aid you in soliciting Membership. You will also be supplied with Membership application blanks.

We truly need your help in this important matter. It would aid us mightily if each Member were to bring in at least one Member more.

Fairfield Osborn

President,
New York Zoological Society

NEW YORK ZOOLOGICAL SOCIETY

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MARCH-APRIL, 1951

Smithsonian Institution
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ANIMAL KINGDOM

THE MAGAZINE OF THE NEW YORK ZOOLOGICAL SOCIETY

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ANIMAL KINGDOM

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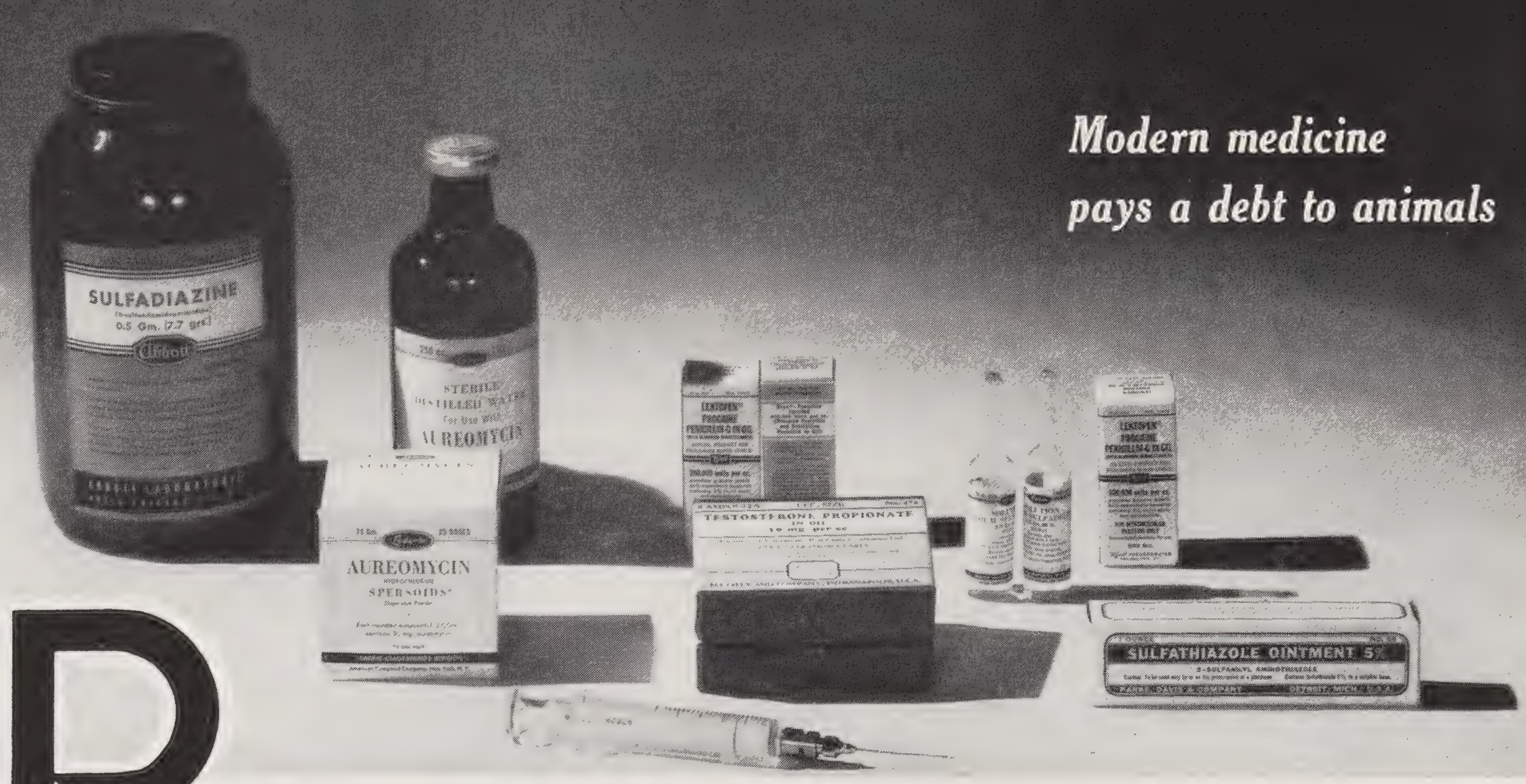
Simla

ALMOST ANYTHING may have happened "once upon a time." Yet the circumstances that have led to the establishment of *Simla,* as well as the quality of the place itself, both seem without precedent. Certainly our institution is enriched and benefited to a degree that is beyond ready expression.

As many of the members and friends of the Society will recall, *Simla* is the name of our recently established field station in the Arima Valley in Trinidad, a large island lying off the eastern shoulder of Venezuela. Its genie is our very own William Beebe, Director of the Tropical Research Department. Fifty years of experience as a naturalist whose realms of study have ranged from mountain heights to "half a mile down" combined with an innate power of perception, have resulted in his selection of the site for the sustained work of this Department in a tropical region endowed with an almost unbelievable wealth of animal and plant life. In latter years this genie, after those earlier and varied scientific odysseys – Himalayas, Sargasso Sea, Galapagos, Bermuda deeps, British Guiana, Venezuela – has been heard to express a longing for a permanent station in the tropics where migrations, life habits, environmental influences, color reactions, ecological relationships and other subjects within the field of interest of his Department could be continuingly studied. He did not wait for others to act. He acquired the property for the benefit of the Society.

What the eye has not seen can never be altogether real. A visit to *Simla,* such as I was fortunate enough to make last month, reveals a place that actually surpasses the descriptions of it that have been made in this publication or at our Annual Meetings. Lying remote within the Arima Valley, it conveys a feeling of permanence to an unusual degree. One finds a symphony and luxuriance of animal and plant life, vital in color and movement, that provide material ad infinitum for the inquiring scientist. Our institution is immensely indebted to the tutelary spirit who has translated an idea into such a reality.

Fairfield Osborn



Modern medicine pays a debt to animals

Rx For Man or Beast

By WILLIAM BRIDGES

AT A MEDICAL SOCIETY MEETING last fall the Bronx Zoo's Veterinarian was approached by a well-known surgeon.

"A friend of mine tells me I ought to visit your Animal Hospital in the Zoo and learn a few things about surgical asepsis," he remarked. "He says he looked through the window of your operating room the other day and he never in his life saw anyone gowned, gloved and masked the way you and your nurse were – he couldn't see anything but your eyes. Do you always take such precautions?"

"Invariably," Dr. Goss replied. Then he waited for the slight lifting of eyebrows he knew was coming. "Invariably – in that kind of operation. We were taking the scent glands out of a Skunk!"

* * *

In that instance the elaborate gowning was more for the protection of the doctor than of his patient, but in general the Zoo Veterinarian's patients lack nothing in the way of asepsis, anaesthesia, "miracle drugs," hormones, transfusions, X-ray diagnosis and modern surgical techniques that is available to human beings in the best hospitals. Indeed, except that he would have to lie on a pallet of straw in a cage instead of on a bed in a private room, a human patient could do far worse than get himself admitted for treatment in the Zoo's Animal Hospital. At his service would be all the necessities and even some of the luxuries, from diet kitchen to pretty nurse.

Veterinary medicine hasn't always been so up-and-coming; the "horse doctor" and the M.D. have seldom had much in common at a scientific level. But today animals can have, and in the hands of modern veterinarians get, most of the advanced medicine and surgery that are available to human beings. It's high time. For many years new drugs and new surgical techniques have been tried out on laboratory animals before being passed on to human beings, and now the animals are being repaid for their contributions to modern medicine and surgery.

The other day I spent an illuminating couple of hours talking to Dr. Goss about this two-way traffic between animals and medicine. I shared his attention with a Wombat on the autopsy table and got a running lecture on comparative anatomy while he excised the eyes for shipment to one research man, the kidneys for study by another, a sample of hair for a police laboratory museum and the brain for a medical school. Our discussion

was also interrupted by a session with the microscope while the Veterinarian examined a fecal sample from a newly-arrived Chimpanzee and made a routine blood count. The setting of our discussion – the laboratory with its microscopes, autoclave, racks of bacterial cultures in test-tubes and Petri dishes, and later the Veterinarian's book-lined office – wasn't much different from laboratories and offices in any modern hospital.

What brought on my questions, I said, was the publication recently of a book on the care and breeding of laboratory animals. It listed no fewer than 18 creatures, from fruit flies to fishes and ferrets, that are suitable for laboratory testing and research. A good many others are used for special investigations, too – Chimpanzees for polio and the common cold, African Elephant Shrews for malaria, Voles for tuberculosis, and so on. The Wattled Starling of Africa is subject to a kind of seasonal baldness from which it spontaneously recovers and after General Curator Crandall published an article about it last year, a research man working on alopecia became quite excited; he thinks he may learn something that will be bad news to the toupee industry.

It looked to me as if the human race had to thank the animal kingdom for quite a lot, and what was the human race giving in return?

Dr. Goss answered that one promptly. "Just about all the medicaments we use here in the Zoo's Animal Hospital were developed primarily for human beings, tested on animals, and now they're routine in veterinary medicine," he said. "If I had to practice in the Zoo without the sulfa compounds, penicillin, aureomycin, vitamins and X-ray apparatus, I think I'd quit and retire to a good fishing spot in Florida.

"Take penicillin as an example of the so-called 'miracle drugs.' Last October little Sandy, our female Orang-utan, skidded on a patch of wet leaves and fell into the moat around her play-yard.

Dr. Leonard J. Goss, the Bronx Zoo's Veterinarian, answers a "hurry" call from the Elephant House. The Animal Ambulance is used to transport small patients. It is equipped with ropes and emergency apparatus.

She can't swim and she swallowed a lot of cold water before the boys fished her out. They held her upside down and squeezed and shook most of it out of her but when I got there she was having the finest case of chills and shock you ever saw.

"Sandy was a good bet for pneumonia, but we gave her a series of penicillin injections, kept her warm, and in three days she was as good as gold.

"Penicillin was a big help when one of our Elephants had trouble with her leg last year. It was her left foreleg, and she kept favoring it. It was hot and feverish and swollen, but there wasn't any break in the skin or any evidence of a fracture. It looked like a deep abscess.

"The rule-of-thumb for animals is 2,000 units of penicillin per pound of patient. We guessed this one's weight at 4,000 pounds and that figured out to 8,000,000 units per injection — a big hypodermic syringe full.

"One of the keepers got a bucket of potatoes and began passing them to the patient one by one, to keep her mind off what I was doing. I simply walked up, gave an alcohol scrub to a spot on the inside of her foreleg where the skin's only about half an inch thick, and jabbed the needle in. She didn't even pull the leg away until I'd pushed the last drop into her.

"After three or four daily injections the swelling went down and she stopped limping."

Aureomycin does a similarly spectacular job and is, in fact, even more effective than penicillin in many treatments. It may be the answer to an

ving an Elephant 8,000,000 units of penicillin in e dose wouldn't have been so easy if the patient d been less tractable. In this instance, a bucket potatoes took her mind off the doctor's actions.

old and serious problem of how to combat "lumpy jaw" in antelopes, kangaroos and the like. That infection of the tooth sockets (actinomycosis) used to be a scourge of the Kangaroo House and in the past fifteen years it has caused the loss of a lot of valuable stock. Keeper Jim Rimmer of the Kangaroo House is by this time an experienced diagnostician of lumpy jaw and when he telephoned Dr. Goss that one of the new Duikers from Africa was down with the disease, the Veterinarian loaded his bag with aureomycin even before going down to look at the animal.

The symptoms were unmistakable — swollen jaw, the animal lethargic, unable to eat.

Human beings usually take aureomycin by mouth but veterinarians have found that in ruminants the drug inhibits bacterial activity that enables the animal to digest the cellulose in its hay and grain. Consequently if aureomycin were given to an antelope by mouth, the high concentration of the drug in its digestive tract would stop digestive activity and by the third or fourth day it would be dead. Fortunately, with a small animal such as a Duiker, it is possible to restrain it a few minutes, inject aureomycin in the jugular vein, and turn it loose. The drug does reach the digestive tract, of course, but in comparatively small amounts and it does no harm. In the case of the Duiker, its lumpy jaw disappeared after four injections. There had been recoveries before, with sulfadiazine and penicillin, but none as quick and spectacular as this.

And again, last fall young Sumaili, the baby Mountain Gorilla that is the pride and joy of the whole Zoo, came very close to pneumonia. She stopped eating, her breathing was labored, she was obviously feverish. She still had a taste for her morning glass of milk, however, so Dr. Goss stirred in a standard dose of aureomycin. Sumaili drank it a few mornings and got well.

Most animals have no more liking for medicine than human beings have, and the M.D. and the D.V.M. use the same tricks of sugar-coating their pills. Nowadays most of the sulfa drugs and the anti-biotics — penicillin, aureomycin and the like — are put up in malt- or chocolate-flavored liquids for easier administration to children. The Zoo's Animal Hospital keeps those sweet preparations on hand and if an animal is known to have a sweet tooth, its medication presents no problem.

Dr. Goss has had a little experience with hormone treatment of animals, but it is pretty inconclusive. It concerns the weaning of penguins. In the wild, young penguins are fed by their parents until they learn how to catch their own fish, but in the Zoo the weaning period finds them totally incapable of recognizing a frozen fish as something good to eat. They would starve if they were not hand-stuffed by their keeper, and hand-stuffing a penguin for anything from weeks to months is a tiresome and time-consuming job.

Two years ago a research man made an experi-

No one could imagine what caused the hard, sca
like ring around a Palm Civet's neck until the anim
was put under the X-ray; then the plate revealed
wire embedded in the skin. It was easily remove

ment of injecting testosterone in a very backward and unwilling-to-feed penguin. To his surprise, within a few days it voluntarily picked up a fish. It developed a voracious appetite and a good deal of precocity in finding and swallowing fish thrown into the water. Dr. Goss found this interesting, and gave testosterone to the next two weanlings that came along. One did seem to respond; it became less timid, more aggressive, and started to feed by itself within a week. The other showed no effects of the hormone whatsoever. Those experiments are now three months in the past and "Willie," the non-cooperator, is still being hand-fed.

Similarly inconclusive, because it has been tried on only one bird, was the experiment of giving a newly developed yeast preparation to a Rockhopper Penguin that had molted but had not gone on to grow a new crop of feathers. For weeks it stood around in a discouraged attitude, the way penguins do when they are in molt, and attempts to stimulate its thyroid activity by iodine came to nothing at all. Then one of the large drug houses produced a new yeast product. Its own research had revealed only its general stimulating effect, so in the good old tradition of trying it on animals, the laboratory sent samples to Dr. Goss. He thought of the reluctant Rockhopper and began feeding it yeast capsules in fish. Within ten days new feathers started sprouting and the Rockhopper went on to grow a beautiful, tight covering of feathers.

Was it mere chance, or did the yeast really have something to do with terminating the molt? Dr. Goss won't have an opinion until he tries it on some more hard-molting birds.

Animals probably contributed very little if anything to the development of the X-ray machine, but the machine has contributed immensely to the well-being of Zoo animals. It and the microscope are indispensible tools.

There was the case of the Lion cub last summer that swallowed the rubber nipple of its nursing bottle. Unless it could be removed, it would pass into the intestine and lodge there, and that would be the end of the Lion cub.

The Animal Hospital's fluoroscope happened to be undergoing repairs at the moment but Dr. Goss got the use of a nearby Veterinarian's apparatus. He anaesthetized the cub to make transportation and fluoroscoping easier, and drove over to

his friend's hospital with the cub flat on its back in the rear seat of his automobile.

The fluoroscope showed the nipple, all right; it was nestled in the lower part of the stomach.

"Well?" said Dr. Goss's friend.

"Let's take it out."

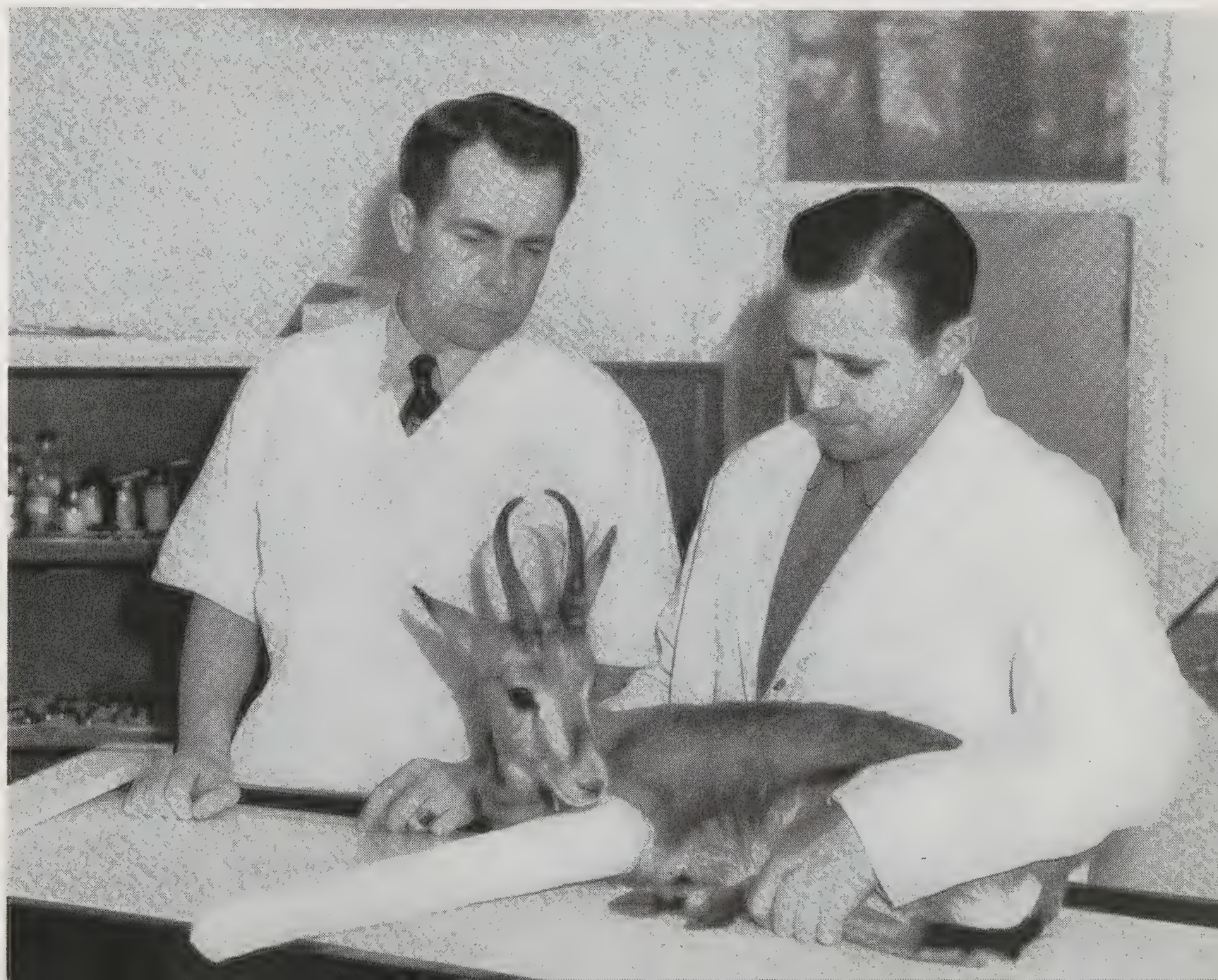
Twenty minutes later the Lion cub had been incised, the nipple picked out, the incision sewed up, and Dr. Goss and his patient were on their way back to the Zoo.

The Zoo's animal collector brought back from the Belgian Congo a Palm Civet that seemed to be in perfect physical condition except for one puzzling blemish; there was a hard, scar-like ring under the hair on its neck. Dr. Goss took an X-ray and discovered that there was a wire ring all the way around the civet's neck, embedded about three-sixteenths of an inch under the skin. Somewhere, sometime, the animal had been restrained by a wire collar and the African native who owned it never bothered to remove the wire. Over the years it had grown into the skin. A little anaesthesia, a few snips of a surgical cutting instrument, and the wire came out.

Dr. Goss uses his X-ray apparatus to resolve such questions as whether a marmoset is pregnant, and whether a bird is egg-bound or has an impacted gizzard, or perhaps is developing a tumor. If it's a case of egg-binding, the X-ray gives him a clear picture of the location and position of the egg and he can generally, by lubrication and manipulation, work it out and save the bird.

Not long ago one of the Aquarium tankmen brought "Tom Howley," the Aquarium's rat-hating cat, to the Animal Hospital for treatment. It seems that Tom Howley had been watching a rat-hole near the Zebra House one night, unaware that a member of the Zoo's rat-shooting squad was watching the same hole. A rat emerged and Tom

Recently a Dorcas Gazelle fell while running and broke a leg. Within a few minutes the animal was carried to the Hospital, X-rayed, and an appropriate splint was prepared.



Accurately positioned because of the X-ray, and fitted with a light splint, the leg should soon be "as good as new."

Trimming the hooves of Musk-oxen used to be on of the Veterinarian's most difficult chores until D Goss invented this crate, which allows the anima to be strapped with bands to one hinged wal

sprang just as the rat-hunter fired. Tom got the rat, but he also got a slug of lead in his shoulder. X-ray revealed the exact location and Dr. Goss removed it.

But with all the modern medicines, modern techniques and modern apparatus in the world, the Zoo Veterinarian still has to be smarter than his animals. Popular belief to the contrary, in Dr. Goss's experience no wild animal "instinctively" recognizes that the Veterinarian is trying to help him, or cooperates in the treatment. Animals resist surgery and medication in ratio to their natural temperaments. Sick or well, a nervous, highly-strung, wary animal wants no contact with a Veterinarian or anybody else, and it has to be tricked into swallowing medicine or forcibly restrained if an injury has to be dressed. Some animals — Musk-oxen, for instance — will struggle against restraint until their hearts give out and they simply fall dead. Greediness is one of the Zoo doctor's best allies — as exemplified in the case a few years ago of the African Rhinoceros that caught its tail in a floor drain and pulled about an inch of hair and skin off the tip end. The wound bled profusely and every time the Rhinoceros switched its

tail – which was almost constantly – a shower of blood splattered the walls of its compartment.

Dr. Goss knew what to do to stop the bleeding – the problem was to apply the remedy. He had his secretary sew up a "poke" of cheesecloth with a drawstring at the open end. Then he lined the long, narrow bag with absorbent cotton and saturated it with thromboplastin, a substance which quickly clots flowing blood.

While a keeper stood at the head of the Rhinoceros and fed it one apple after another, Dr. Goss sent a keeper around to the rear of the ton-and-a-half animal to slip the poke over its tail.

Everything worked smoothly, except that the Rhinoceros consumed apples faster than the keeper had expected. The "bait" ran out after about three minutes and the Rhinoceros became restive and walked away, switching its tail as it walked. The poke had been so hastily attached

Once the Musk-ox is secured, the wall of the crate is swung down to the ground as a sort of table, and the Veterinarian can go to work on the overgrown hooves. Matted, shedding hair also can be removed.

This little Bison calf was stepped on by one of its parents and the result was a broken leg. Dr. Goss devised a modified Thomas splint, of the type used for human beings, and the calf could move around easily.

that the drawstring knot did not hold, and in another minute or so it worked loose and went sailing through the air. The Rhinoceros watched it fall, eyed the strange object for a moment — and then he ate it. Drawstring, cotton, thromboplastin and all. But the poke had been in place just long enough; the blood clotted and ceased to flow.

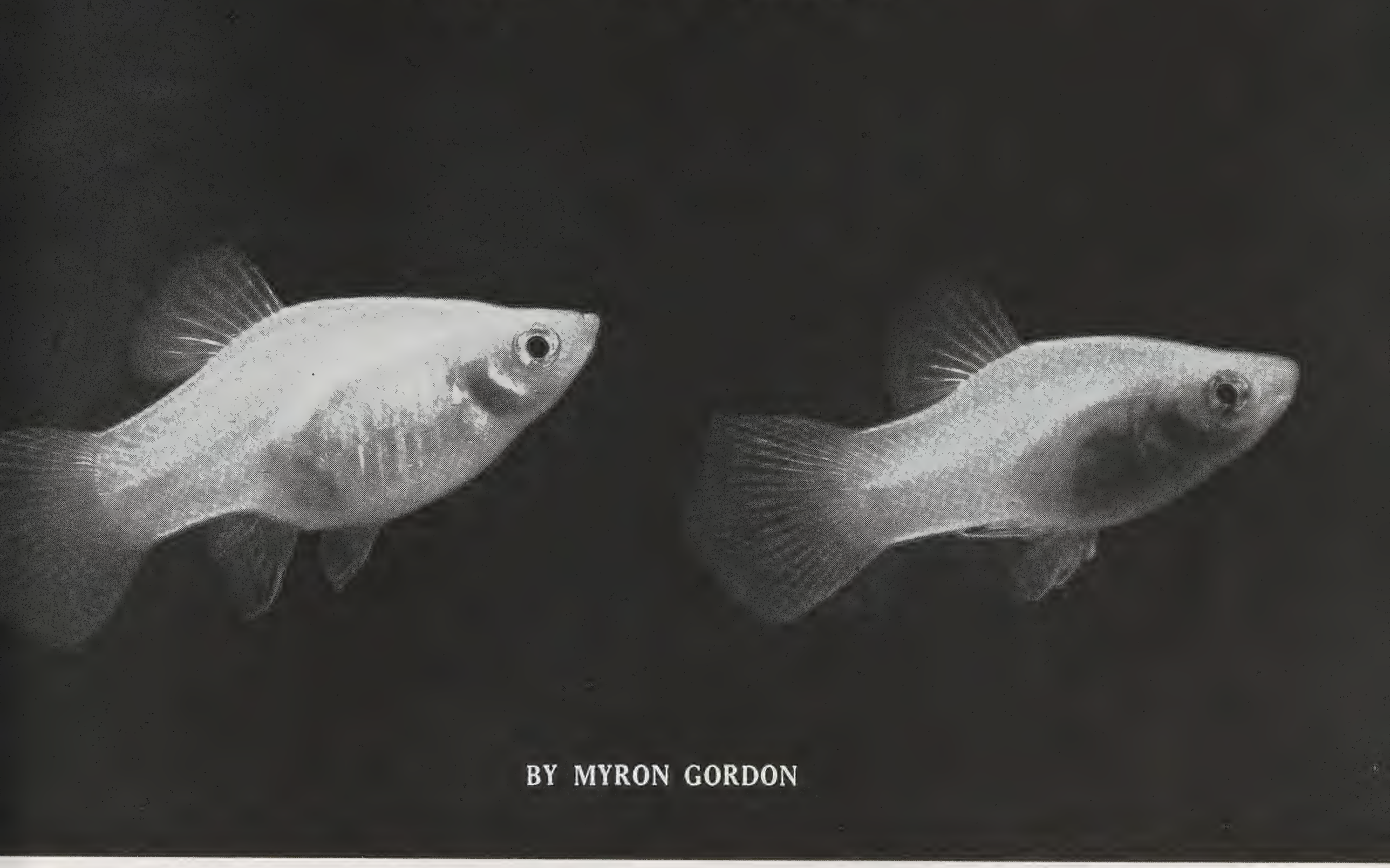
Sometimes the Veterinarian finds it easiest to take advantage of an animal's natural habits — as for instance when Makoko, the 430-pound Gorilla, developed a hard, sore, cracked spot on the sole of one foot. Dr. Goss trained a keeper to aim a mechanic's spray gun with such accuracy that he could hit a penny at five paces, and then he loaded the gun with an antiseptic and lubricating mixture and instructed him to spray Makoko's foot through the cage bars every morning. It worked fine. The sticky liquid covered the Gorilla's foot and his curiosity, and dislike for it, made him try to rub it off — which merely rubbed it in, of course. That was just what the doctor wanted and after a couple of weeks of spraying and rubbing the foot healed.

Even blood transfusions are in the Zoo doctor's bag of tricks. Last year Ginger, a young Dromedary, developed a cystic kidney and got in such a condition that, had she been a human being, a blood transfusion would have been clearly indicated. It happened that two healthy Dromedaries occupied the adjoining stall, and it was a simple morning's chore for the Veterinarian to take blood samples, "type" them to make sure they were compatible, and then draw two quarts of blood and drip it by the standard transfusion method into the ailing Ginger.

* * *

Transfusions, X-ray, hormones, penicillin, aureomycin, the sulfas — they all, or most of them, have made the round trip from animal experimentation back to animal healing. Animals helped make them safe for us, and now the modern Veterinarian is using them to improve the lot of animals. It's the least we can do.

How the Bleeding-heart Platy Was "Invented"



BY MYRON GORDON

In the flying cage in the Zoo's Bird House I was entertained, several years ago, by a variety of birds from many parts of the world. Some were almost constantly in flight, others waded in the pool below the fountain. Near one corner where I stood, an inconspicuous gray-blue-backed pigeon was lying, resting on the clean, white, dry sand. It rose slowly and walked toward me in hesitating steps. Now I saw its white breast clearly and the frightening fact that some of its breast feathers were stiff and streaked with blood-like crimson. My impulse was to call the keeper, but I first searched the picture labels to find the bird's name. The picture was unmistakable, and the name allayed my fears – it was called the Luzon Bleeding-heart Pigeon. So the "blood" was part of the natural color pattern!

When, some years ago, a bright ruby-throated platyfish was developed in the Society's Genetics Laboratory, my mind flashed back to the pigeon

with the crimson breast, and I thought that "Bleeding-heart" was just the right name for the new fish. Now "Bleeding-heart Platy" is the name it bears in the aquarium world. This is the story of its discovery, or, rather, of its development, for the Bleeding-heart Platy is completely man-made as far as its markings are concerned. In that respect it differs little from the man-made breeds of dogs, poultry, cattle and so on; the difference is that we usually know very little about how, when and by whom these domestic breeds were developed, whereas every stage in the creation of the Bleeding-heart Platy-fish is on record.

The Bleeding-heart had its origin in two distinct lineages, one wild, the other long domesticated. The domesticated element was another creation of the Genetics Laboratory – the so-called Ghost Platy. Since it played such an important part in the breeding of the Bleeding-heart, I shall first explain how we "made a ghost." It was one result of certain genetic experiments being run off in the laboratory.

In these experiments, a Leopard Platy with black spots on a white background was crossed to a clear Goldplaty. Their contrasting characters were these:

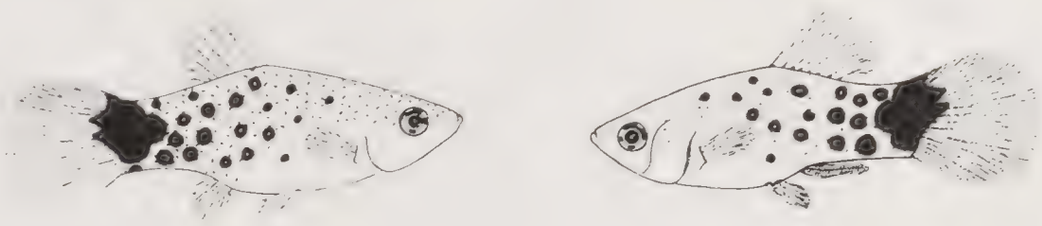
Leopard Platy	Goldplaty
Black spots	No black spots
White body color	Golden body color

"A Leopard Platy was crossed to a clear Goldplaty."

The trick was to extract the white body coloring of the Leopard and the unspotted feature of the Goldplaty and to combine these two desirable features.

Now, in terms of Mendelian factors of inheritance, it may be said that the black spots of the Leopard Platy parent are dominant over the non-spotted condition of the Goldplaty, so that the spots would persist in the first generation offspring. At the same time, the gold body color of the Goldplaty is dominant over the white body coloring of the Leopard Platy, so that the first generation offspring would be gold instead of white.

Thus, just as I had reason to expect, when the Leopard Platy and the Goldplaty were crossed, their offspring were black-spotted fish with gold body coloring.



"Their offspring were black-spotted fish with gold body coloring."

These black-spotted-gold hybrids were not, in themselves, what I wanted but they had within them the traits that I could now proceed to extract. Their really valuable combination of characters was being carried as recessives – whiteness and unspottedness. By mating two of these hybrids I should get what I wanted – a white, unspotted fish – in the proportion of 1 out of 16 offspring.

9 OF THESE
Black-spotted and golden, like the first generation fish.

3 OF THESE
Black-spotted and white, like the grand-parent Leopard Platy.

3 OF THESE
Unspotted and golden, like the initial grand-parent Goldplaty.

1 OF THESE
Unspotted and white — the new Ghost Platy — the desired combination.

"By mating two of these hybrids, I should get . . . a white, unspotted fish in the proportion of 1 out of 16 offspring."

For my immediate purpose of producing a colony of filmy white, almost transparent fish, only one out of sixteen second-generation offspring was valuable, of course. But quite large numbers of young were produced, so that there were plenty of Ghost Platy brothers and sisters to breed together to establish a real colony. I could be sure of *their* offspring being white – they carried a combination of recessive hereditary factors so that they always "breed true."

So much for the domesticated side of the Bleeding-heart Platy's inheritance.

NOW FOR THE REMAINING ELEMENT in the production of this new fish — the wild side of the Bleeding-heart's ancestry. It was the side that contributed the distinctive crimson splash on the throat — the "bleeding-heart."

The members of natural populations of wild platyfishes that live in the quiet waters of Mexico, Guatemala and British Honduras, and probably in many other as-yet-unexplored territories of Central America, are exceedingly variable in their coloring. More than one hundred and fifty different markings in black are known from the platyfish that were collected in their native jungle pools and streams and, in addition, the platyfish have four distinctive red or orange patterns.

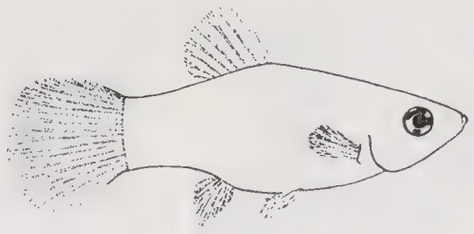
You might think that since the wild fish already have the red markings of the Bleeding-heart type, chance would have produced some wild fish exactly like the one we were striving to create in the laboratory. The fact is that despite the great variability in the coloring of the wild types, the Bleeding-heart pattern of a red "heart" and a white body is man-made.

In 1939 the New York Aquarium's expedition to Mexico brought back a substantial stock of wild platyfish from the lowlands of the Rio Jamapa. The fish were caught in weedy jungles of aquatic plants in a roadside ditch, only a few miles from the city of Veracruz at a place appropriately called Plaza de Agua. In the profusion of multicolored platyfish that were netted, there were many males with copper-tinted throats and undersides, but their bright coloring was in combination with patterns of blacks and grays.

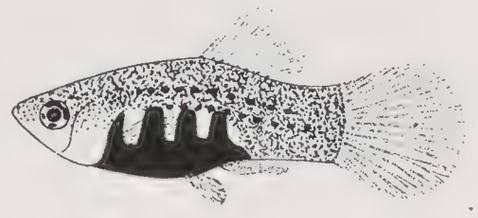
The brighter-colored wild fish we called "Ruby-throat Platys," regardless of whatever other color patterns they may have had.

Looking at these wild fish with their red throats, it occurred to me that the red would be emphasized if we could eliminate the black and the gray on the remainder of the body. The obvious thing was to transfer that red throat to the white-bodied Ghost Platy that had already been developed. The first step was to mate a Ghost Platy and a wild Ruby-throat. Their contrasting characters were these:

GHOST PLATY
White body coloring
Unspotted



WILD RUBY-THROAT
Gray body coloring
Black-spotted
Ruby-throated



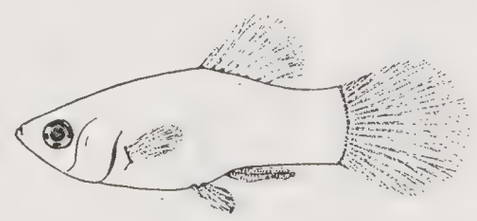
"The first step was to mate a Ghost Platy and a wild Ruby-throat."

An abundant brood was obtained from this mating, and all the young fish resembled their wild Ruby-throated parent. This was because the gray body coloring is dominant over white body coloring, black-spotting is dominant over unspottedness, and the ruby-throat trait is dominant over absence of this character.

"All the young fish resembled their wild Ruby-throat parent."

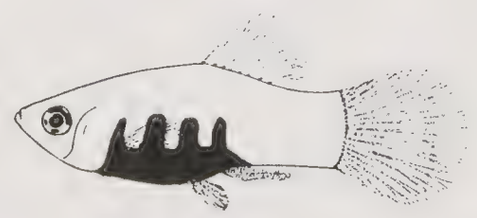
There was just one more step in the creation of the fish I had decided to create, the Bleeding-heart. These first generation offspring of the Ghost and the Ruby-throat had genetic characters all ready to fall into place, and when they were inbred, brother to sister, 3 out of every 16 second-generation offspring were ruby-throated and white-bodied — in other words, the Bleeding-heart Platyfish I was seeking.

3 OF THESE
Gray, the wild type.



1 OF THESE
White, the Ghost type.

9 OF THESE
Black-spotted, ruby-throated, gray, like the original wild type.



3 OF THESE
No Black-spotting, ruby-throated — the desired Bleeding-heart Platy.

"When they were inbred . . . 3 out of every 16 were ruby-throated and white-bodied —the Bleeding-heart Platyfish."

Wild Platyfish were taken in nets from such shallow and muddy pools as this, near the Rio Papaloapan, Mexico. The collector is wearing a net because of the mosquito swarms.

So, at last, after all these steps and stages (which are really quite simple ones, as selective breeding goes), we had the fish we set out to create. It was fortunate that the black-spotting of the wild Ruby-throat was reduced by the Ghost trait of unspottedness, for spotting is attached by inheritance to the Ruby-throat trait and is not readily broken. By watching broods of Bleeding-heart Platys carefully, better and cleaner-cut variations have been selected and bred, so that now we have fish with clear bleeding-heart markings and virtually pure white bodies.

One problem remains for the keen breeder of aquarium fish. The Bleeding-heart character has not as yet beeen developed in the female platyfish — only the male has the brilliant red coloring. But I am confident that soon the female will be as colorful as the male; such developments are not without precedent.

The Bleeding-hearts were first put on public display in 1948 at the Aquarium in the Zoo as a demonstration of a new variety for the home aquarium. In the summer of 1949, my friend, Dr. Frederick Proewig, suggested that I give him a stock of Bleeding-hearts so that he might take them to Germany. He accomplished his mission and he tells me that the German aquarists were delighted by the colorful new variety of one of their favorite species. Recently, a note in one of their new aquarium magazines recorded the Bleeding-hearts' arrival in German aquaria with enthusiasm.

Many of the native Central American aquarium fishes, including the platyfish, did not come to the United States directly from our adjacent continent, but from European fish culturists who got them first and developed them. Now, in some measure, American aquarists have repaid a debt to European aquarists.

Around the Zoo

Camera Portraits

A White-tailed Deer fawn surveys the world and springtime from a snug, safe hiding place.

Even a long-haired Yak appears cool and comfortable against a cloud of blossoms.

Trumpeter Swans, photographed many years ago by Elwin R. Sanborn. We no longer have these almost-extinct birds in the Zoo's collection.

Argentine Pearlfish are strikingly beautiful small tropicals. The males are strongly colored but the female (upper right) is a washed-out brown.

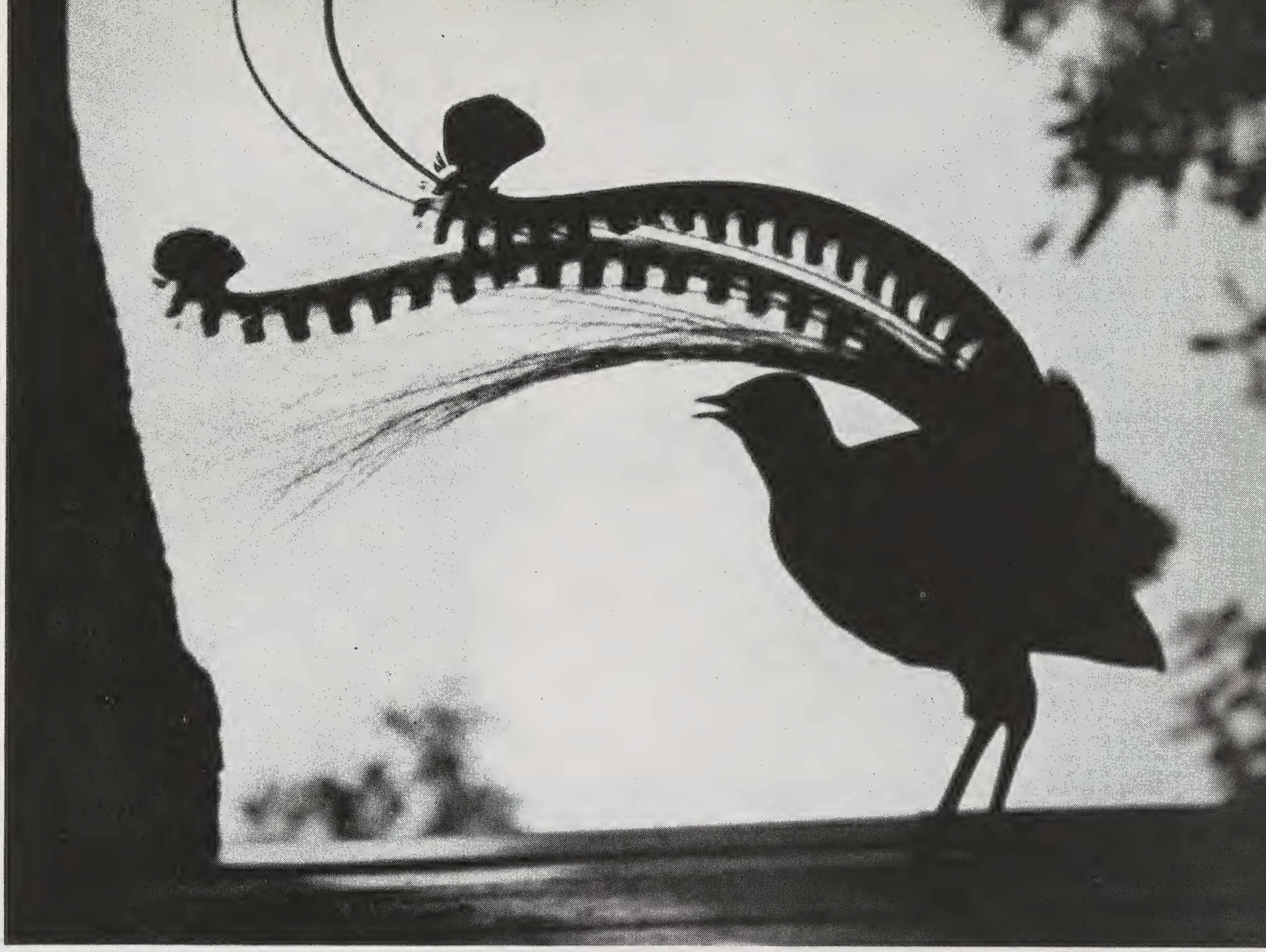


Photo by Fred Lewis

A new start in life in Tasmania?

Trapping Lyre Birds for "Resettlement"

By DAVID FLEAY

At various times during the past twelve years the Victorian Game and Fisheries Department has asked me to undertake the responsible, delicate and somewhat onerous task of capturing Lyre Birds and bringing selected individuals unharmed from their mountain fastnesses for quick transit by air to new areas. Such moves have followed governmental approval of applications from such a State as Tasmania where conditions are ideal but the species does not occur naturally. Young birds of my selection and capture have also gone in the past two years to the enlightened and progressive Zoological Park in Adelaide, South Australia, where in an ideally sheltered aviary they have flourished exceedingly well, and are providing notes of decided interest.

Here at Badger Creek, Healesville, Victoria, our home is within sight of Lyre Bird territory —

the wild, heavily timbered ranges running 200 miles without break in an easterly direction before swerving northwards at the far corner of the State to become the eastern highlands of New South Wales and Queensland. Deep, dark and damp gullies of rich soil and thick humus, starred and canopied over most of their bottom reaches by luxuriant, rasp-trunked tree ferns, lead down into larger gullies. Above the fern growth stand the dark green blackwoods, the sassafras, the blanket wood, the musk, the hazel, the wattles and far above, again, the towering, bark-draped mountain ash giants. It is a scented and impressive environment and in the bush proper one seldom walks the soft yielding soil for long without noticing broad scratchings exposing the fresh rich earth. Rotting sticks, leaves and curling strands of bark that cover the ground in profusion have been raked and flung back by powerful feet, and in steeper gullies, over a period of years, tons of soil have been thrown downhill. Here the Lyre Birds are at their everlasting quest in the dim gully light, patiently scratching for crustacean land hoppers (Talitridae), garden slaters, millipedes, beetles and their larval grubs, centipedes, earthworms, wire worms, termites and even small lizards. While the birds are generally widely distributed over this country it is not always possible to find a sufficient concentration of them to snare successfully. Great forest fires in 1939 incinerated even the food-nourishing humus and it is to favored areas, spared that dreadful holocaust, that one must turn.

In the Australian summer of December, 1949, I made a journey 25 miles from home to secure an additional pair of adult Lyre Birds for liberation in the Tasmanian National Park,[1] and also

Photographs by the Au

a year-old immature male for the Sir Colin Mackenzie Sanctuary. The nesting season was over so there was no question of interference with brooding birds.

Stacked with gear, the old car eventually left good roads and ascended an old and bumpy timber track winding ever upward as it skirted granitic mountain shoulders and crossed corduroyed shady creeks resonant with the metallic "tink-tink!" of many Bell Birds (*Manorina melanophrys*). We came to rest on the site of a hut long since demolished by fire but marked by a growth of exotic garden flowers remarkable in an Australian bracken setting. They were fox gloves! We outspanned beside the clear-water creek and already from the slopes above came a faint, familiar and ringing "Quolp – quolp!" – a sound that might also strike one's fancy as "Blick –blick!" Up there a cock Lyre Bird had paused in his industrious raking of the forest floor and the bush resounded with his repeated challenging notes – that double call that carries so much further than any other of his notes and is both prelude and interlude to the famous winter concerts in May, June and July. At this summer season the birds were comparatively quiet, for in December tails of the cocks have scarcely reached full length after the October shedding.

With equipment slung on backs and fern hook and hatchet in hand, we began the plod, slash and push through the scrub to cut a track up the mountain side. All was very quiet among the aisles of tall, smooth trunks until very suddenly again, and from a hidden gully ahead, came the "Blick – blick!" of that same cock bird. Louder and clearer now, the bird added a short session of "recorded music"– the laughter of Kookaburras, the "Guinea-a-week!" of the Pilot Bird, the sharp crack of the Whip Bird, the shriek of swift-flying crimson parrots, the cry of the Wedge-tailed Eagle and the favorite rich melody of the Gray Thrush. It was good to hear the Lyre Bird in such a gay mood and good voice in this off season.

The bird appeared to be in the very next gully, and as silently as possible we began to descend, slipping and sliding and looking down on massed tree ferns as we breathed the aromatic scents of the gully. But the Lyre Bird has keen hearing, and apart from a piercing "Zing!" of alarm we heard no more. The tree ferns closed in, but there were dim and cool, cloister-like passageways between their rough trunks. Dried and musty fronds hung low, ready to break and crumble into dust at a touch. There was chaos where starkly bleached trunks had fallen at confused angles – relics of giants dead these many years and now brought low by storms and the industry of the lowly termite. Obviously this was a good place for snares, for the whole forest floor was newly scratched over and at the gully bottom there were narrow passes between logs and an assortment of strategic positions. Several Lyre Birds seemed to be in the habit of visiting this gully – almost certainly a proportion of them would be youngsters ranging from four months to two or three years of age. At the moment, despite quiet movements and lack of talk, not a bird was seen. It bore out what we had learned elsewhere – except in certain tourist areas where a few birds are semi-tame, the forest Lyre Bird is most elusive and self-effacing.

While scanning the forest floor for signs of the bird, I spied and picked up a male's filmy tail feather, half-buried and bedraggled. It must have moulted out several months previously; already it was almost interred by the industrious raking of busy feet. Up the gully we could see thickets of thin, straight, tall-growing native hazel that by careful selection and cutting would produce satisfactory rods for springer snares. When a rod is driven into the earth on a 45-degree angle, it is bent over and held to a stake by a small twig trigger, the tension of which maintains a short cross stick spanning the Lyre Bird track. Over this, and well camouflaged, a soft hemp noose is spread and attached to the end of the rod. The whole set-up is so designed that the pressure of a Lyre Bird's toes on the cross member releases the hazel springer. Instantaneously it flies up, drawing the loop tight about one or both feet. The whole art of snaring is in the adjustment to such a nicety that there is sufficient tension for rapid action but no danger of suspending the bird above the ground where its struggles might cause permanent injury to a leg.

his deep and dark tree fern gully is a typical abitat of the Lyre Bird, and seemed to be a good ot for one of the snares. However, the first capture this particular snare was of a Mountain Possum.

A male Lyre Bird in perfect condition. Caught in a snare, it was released immediately and therefore its plumes were not harmed.

The difficult terrain of the Lyre Bird gully and the necessity of being extremely careful about setting the snares took up so much time that we could rig only twelve snares that day. While we worked it was diverting to watch the cheeky Yellow Robins darting about one's hands where disturbance of the rich soil exposed Tallitris land hoppers, wire worms and many delicacies beloved of such small fry.

That night we camped at the car beside the clear-running stream with a Mopoke (*Ninox boobook*) calling pleasantly and restfully. Our only near visitor was a big, woolly-furred Mountain Possum which trumpeted its distrust of the flickering firelight and the intruders from a perch in a nearby eucalypt.

Next morning a round of the snares revealed a totally untouched state of affairs; the birds were suspicious and had not even disturbed the debris roundabout. Tension had slackened in the green poles and slight but important readjustments were necessary. While I was re-setting one without taking the precaution to hold out a protecting arm, it sprang up and rewarded me with a thumping crack on the temple. This one was obviously too hair-trigger altogether!

On this second day we rigged fourteen more snares in other fresh-sign gullies within a mile of the first one. That evening Lyre Bird scratches could be seen close to a few of the first batch of snares, and we felt more encouraged. Our belief that this was a good spot was confirmed.

On the third morning things had begun to happen. The No. 1 snare was not only sprung but the rod was broken in half and the hempen twine was chewed to a frayed string. From the evidence of torn-up earth and barked sapling stems, a hundred-pound Wombat must have strayed in during the night and had been put to some slight inconvenience before passing on. But

as soon as we rounded a gigantic log and came in sight of No. 3 snare, a frantic, guttural squalling and screeching assailed our ears and a chocolate-brown bird flapped and jumped in the snare. It was a fat and obviously newly-caught hen Lyre Bird. It is vital to be close at hand when these birds are captured, for their penetrating alarm notes are liable to bring foxes on the run. Two other snares had been set off and were ruined by the struggles and strong teeth of Short-eared Possums. Odd patches of fur identified our night callers. Resetting and putting the snare line in order preceded a return to camp, where the plain-tailed Lyre Bird was fastened in a roomy, grass-padded tea chest. We then drove her home to Badger Creek and released her temporarily in the semi-darkness of a garage with a generous helping of termites. Equipped as they are for keen vision in a dim light, newly caught Lyre Birds are best housed temporarily in this fashion. Next morning we were back on the trap line and scrambling over tree fern trunks as an airplane roared southward across Bass Strait, carrying Mrs. Lyre Bird for immediate liberation that day in the National Park forty miles northwest of Hobart, Tasmania, and 400 miles from the scene of her capture.

Not every day produces a catch in this type of hunting and the sun rose and set several times without giving us more than a fine Mountain Possum, which so entangled its noosed paw about the branches of a mint bush that it had no chance to chew off the snare, and could only sit blinking at us in morning sunlight.

Then came a period when low clouds and trails of vapor hung across the sombre hills. Water dripped from the leaves and hanging bark of the gully eucalypts and the ferny under-scrub was fog-wet and mist-drenched, so that the most waterproof garments were wet through. Rain and a hail storm clogged all snares and they had to be reset time after time. On the day of great-

Much less spectacular than the male is this female Lyre Bird, the first female captured. It, also, is in magnificent condition.

est dampness and discouragement I heard, as if in mockery, the swelling, challenging melody of Lyre Birds from all points of the compass.

However, operating alone now, and moving quietly a good deal up and down the gullies, I caught odd, fleeting glimpses of Lyre Birds, and one day while crossing a "saddle" into the head of an opposite gully and being guided by a voluminous outpouring of "Blick-blicks!" and bursts of song, I watched unobserved for five minutes while a beautiful, full-tailed cock bird sang from a perch on a fallen tree. Around him, preening themselves on adjacent limbs, were no less than five plain-tailed birds – how many of which were hens and how many immature males it was of course impossible to tell without standing right among them. It was especially diverting to hear this Lyre Bird's rendering of the call of a European Black Bird – a bird which has penetrated these fastnesses only in recent years.

Then, in a snare near a cave-like burrow and curiously-holed log which had been rubbed to a bright polish by the local Wombat in his consistent and typical back-massage, a second hen Lyre Bird was captured. My self-congratulations were short-lived, however, for even as I removed her from the noose I could hear, although not see, the pathetic cheeps of a well-grown fledgling. And so I merely photographed the hen and liberated her, for a fledgling is dependent on its mother for seven to eight months and this little chap would probably have perished without her. The day was further enlivened and complicated by the capture of a nice Mountain Copperhead (*Denisonia superba*) right in camp. It is extremely awkward while carrying a Lyre Bird in one hand to have to gather up a fractious, venomous snake in the other!

Knowing by now the actual territory roamed by the cock Lyre Bird I had heard on the first

A Lyre Bird reacts to handling by clutching with its powerful, curved claws. They are long, but fortunately they are not sharp.

Left to Right—A fledgling Lyre Bird, an immature male about four years old with its plumage not yet fully developed, and an adult female. These birds are in captivity and on their way to resettlement in a new area.

day and having glimpsed him once when in an incautious moment he chased an immature bird out of his gully past me, the quest boiled down to a matching of wits. Time and again he scratched great quantities of material over my snares. Sometimes the rods were sprung, but more often than not the nooses and triggers were simply buried under barrow-loads of scratched-over debris.

One morning, a whole week after the initial work in the gully, I heard danger calls of "Quisst!" faint and far away, but in the direction of the male's favorite feeding grounds. Seconds later a tremendous squalling and scolding summoned me to a breathless climb and scramble into the gully. Sure enough, His Highness was tethered to a quivering, dancing snare pole. He had taken a short cut through a natural pass where, in anticipation of that very thing, I had set a snare. What a glorious, lustrous-eyed bird he was! My arrival was in time to prevent damage to one single feather of the sixteen in his 26-inch tail! He was a simply perfect specimen

of the mature Lyre-tail. His tail was a symmetrical, shimmering delight – twelve filmy plumes plus two curved and saw-edged tape or "feeler" feathers, and, of course, the pair of huge outside "windowed" rufous-and-black lyrate feathers. His strong scratching legs and feet were bigger and more powerful than those of the hens and at once, on being handled, he reacted as Lyre Birds do, not pecking with his beak but seizing one's hands in a powerful foot clutch that is quite painful and tenacious, much in the manner of a hawk or eagle. With great care for his splendid tail, so easily broken in the struggles of these strongly built birds, I carried him down gully and across the ridges to camp. As usual I felt somewhat conscience-stricken about taking such a prince of songsters away from his haunts, but in a dark and well-ventilated tea chest he sat quietly and philosophically while the car jerked and bounced on its journey through the bush to the low country. Once again, early the following morning, an Australian National Airways DC-3 winged across the sea to the southern island State. By early afternoon this fine bird had scampered into dense scrub practically identical with his own. As in all of Tasmania, his destination, the National Park, is quite free of foxes and its total of introduced Lyre Birds rose that day to eight pairs.

But there was still hard work to be done in the heart of the Victorian ranges before I could bring the quest to a conclusion. Even in summer these rain forests are so often dripping that work is retarded by days. Fortunately fine warm weather now prevailed and there remained only a cock bird to secure for the Sir Colin Mackenzie Sanctuary. As the bird would be domiciled in an enclosure, it was essential that it be a youngster in the "hen-tailed" stage, for no mature male Lyre Bird will thrive in any other environment than that peculiarly its own. This forest artist is very long lived and slow developing in the wild, but once removed to artificial surroundings it frets and pines away rapidly.

It was warm and thundery on the first afternoon of my renewed quest, and driving homewards through stringy bark timber I became aware of a fair-sized Copperhead snake lying head up on the road. As the car stopped, this lively fellow shot across and into the steep-walled ditch. I jammed a heavy-booted and thick-trousered leg ahead to block the snake's escape and bent to seize it by the tail. To my horror the snake rushed over my boot and shot up inside my left trouser leg! By some instinctive reaction both hands clapped simultaneously round the knee, and were in time to stop further ascent. An inch of tail still wriggled at boot level. I gave it a lightning jerk born of sheer desperation. Down came the snake and in another minute I had it imprisoned in a bag. There were no fang marks on my leg, so far as I could see or feel, but in that wild panic of fast movement and with legs already profusely scratched by the scrub, I was unsure and shaky for hours.

The next and fourteenth day of the Lyre Bird operation was the last. An ideally suited and vigorous young male stepped into one of my snares. Big and leggy as he was and so much lounder than a hen bird in his earsplitting screams of protest, I felt pretty sure of his sex even before examining the underside of the plain tail. Dorsally the feathers were quite indistinguishable from those of hens, but the undersides of the two outermost and slightly curved lyrate feathers were quite strongly barred on a silvery-white ground with rufous "windows," and there were rufous-tinged outer webbings on two or three adjacent feathers.

With the quest concluded and the immature cock bird carefully stowed in the tea chest, I pulled all snares and turned my back regretfully on this dense forest region to set out for the Sanctuary and the bird's new home. As I boarded the old car I was pleased to hear, again, a faint and distant "Blick – blick!" float down from the crest of the range. Somewhere up there a cock Lyre Bird was going about the business of the day. At that same moment two more of his kind would be scratching in the forests of Tasmania, protected and safe from foxes. I felt rather good about it all.

[1]From August, 1934, to June, 1950, eleven pairs of Lyre Birds have been sent from Victoria for liberation in Tasmania. Of these, eight pairs went to the National Park and three pairs to the Hastings area 40 miles south-by-west of Hobart. Evidence of nesting by Lyre Birds has been discovered in the National Park.

Detail of the acclimatization are:

National Park	*Hastings*
1934 — 1 pair	1945 — 3 pairs
1935 — 2 pairs and 1 male	
1938 — 2 pairs	
1941 — 1 pair and 1 female	
1949 — 1 pair	

News from the Conservation Foundation

Ordway and Cain Give Addresses At Pacific Coast Conference

Samuel H. Ordway, Jr., vice-president of the Conservation Foundation, gave the keynote speech at the opening meeting of the Second Regional Conference on the Conservation of Natural Resources held for the benefit of the Pacific area. His subject was "Conservation in Our Time." This conference, held on January 25-27 at the University of California, Berkeley, was attended by some 1,000 conservationists from the Coast and Rocky Mountain areas.

Dr. Stanley Cain, Professor of Conservation at the University of Michigan, also attended the conference under this Foundation's auspices and he too addressed the convocation on "The Interdependence of Man and Natural Resources."

In a letter to Fairfield Osborn from Roy E. Simpson, Superintendent of Public Instruction, California State Department of Education, the participation of the Foundation was praised in these terms: "You should know that the presentations by Mr. Ordway and Dr. Cain were the highlights of the meetings. We have never had such brilliant statements, and they will be used far and wide in this State. . . . We want you to know that the Conservation Foundation gave considerable additional status to this Conference."

Boocock at Wildlife Conference

Kenyon Boocock of the Foundation staff represented us at the North American Wildlife Conference in Milwaukee, Wisconsin, on March 5-6-7. He was accompanied by James Simon, director of the Jackson Hole Wildlife Park, who represented the New York Zoological Society at these meetings.

Boocock also attended the deliberations of the Natural Resources Council in Milwaukee on March 4. This conference was held for the purpose of developing a national conservation policy and program.

John Storer Completes Work on Conservation Films

With the production of "The Living Water" film series this spring, John Storer will have completed his notable contributions to the motion picture program of The Conservation Foundation. Since the program's inception four years ago, Mr. Storer's vivid, imaginative photography has been the cornerstone upon which all the Foundation's film activities have been based. The variety of material that has been captured by his lens must be seen and studied to be fully appreciated – the spawning Steelhead piercing a waterfall, a dust storm, a Bighorn ewe silhouetted against the sky, a destructive river-flood, the grinding crash of a giant redwood – all of these will stand as parts of the hallmark he stamped upon his work.

John Storer's part on the Foundation's film team has been that of the man in the field faced with the job of finding ways to do the mad things that the home office asked of his lens. Inducing a Pocket Gopher to dig his hole in front of the camera, catching the Ibis a-wing, filming the silent flight of a prowling owl are chores that take many miles of travel, many hours of work, immeasurable ingenuity. These precious things which fly past in moments on the screen are the details that have given vitality and freshness to our conservation pictures. And the cameraman is either capable of such results or he isn't.

It is difficult to assess the individual value of any man to such a program. We do know that without Mr. Storer's painstaking care for detail, his eye for the best camera angle and his genius for making wildlife cooperate with his script, we would have a far less rich and effective film program. – Fairfield Osborn.

Ordway and Snider Meet With Range Management Group

On his way to Berkeley in company with Robert G. Snider, Foundation Research Head, Mr. Ordway also attended the wintry, snow-bound meetings of the American Society of Range Management held at Billings, Montana, on January 23-25, being hard put to it to get from Billings to Berkeley at the peak of Rocky Mountain winter in time for his opening speech there.

Mr. Snider visited Berkeley, too, for the purpose of conferences with Professor Carl Sauer and other members of the California faculty. Mr. Snider had meetings also with various specialists at the California Institute of Technology at Pasadena, and visited the Marine Laboratory in La Jolla on similar errands. He was studying opportunities for further work on water problems and marine resources in pursuance of the Foundation's research program.

Interesting Coincidence

The recent order of Secretary Brannan of the Department of Agriculture unifying the field services of the Department is of great interest to the Foundation staff. For the first time the Soil Conservation Service, the Production and Marketing Service and the Extension Service will be housed under one roof for greater economy of effort.

Our cause for pleasure in this event lies in the fact that this move is in effect the first step towards carrying out the recommendation of the Foundation, contained in Samuel Ordway's brief entitled "An Approach to Organization Within Government to Advance the Conservation of Natural Resources."

It would be a constructive move, we feel, if parallel services supplied by the Department of the Interior were also housed in the same structure and were integrated with those of Agriculture.

Don't be an Aardvark

AARDVARKS are "Earth pigs"—according to the Boers. And nobody wants to be one, not even another Aardvark.

Don't be piggy about your Society membership. Let your friends in on the fun, the excitement, the many fascinating, stimulating events that take place throughout the year in the activities of the New York Zoological Society.

Help us gain more new members. Make gifts of Society memberships. At least, send us the names of people you know who will benefit from your Society's important work in research, education and conservation.

Mail them to:
MEMBERSHIP CHAIRMAN,
New York Zoological Society,
New York 16, N. Y.

BEHIND THE SCENES

NEWS AND NOTES OF THE ZOOLOGICAL PARK, THE AQUARIUM AND THE DEPARTMENT OF TROPICAL RESEARCH

Latest News from Dr. Beebe's Forty-ninth Expedition

When the Department of Tropical Research is afield on one of its expeditions, Dr. William Beebe usually sends a series of informal reports back to the Zoological Society's officers. His Report No. 1 from the current (forty-ninth) expedition to Trinidad has just been received and below we reproduce a few paragraphs on his refinding of a colony of Hoatzins along the San Juan River in Venezuela. Many years ago, in "Tropical Wild Life in British Guiana," Dr. Beebe had reported at length on this curious bird. He now writes:

"After lunch we obtained a launch and started upriver with the forlorn hope of finding a stray surviving Hoatzin. Around the very first bend a splendid single bird was discovered on a swaying liana, so busy trying to break off twigs for a prospective nest that we backed almost beneath without alarming her. Next we flushed a flock of nine Hoatzins, then eight, and so on. The climax came when we nosed the bow within a foot of a low-swung nest with two eggs. These we took and found they were freshly laid. (Incidentally when we reached Simla and I blew the eggs, cook made the contents into a diminutive omelet of which we all partook. Now each of us can say, 'The last time I ate Hoatzin's eggs . . .')

"The finding of these birds was the highlight of the whole voyage, for this primitive, reptile-like bird is one of the greatest prizes for exhibiting alive in our Zoo. We now know the place, the time and an easy means of transportation for capturing the adult birds and making motion pictures of the three-fingered and clawed, lizard-like nestlings. One of the most interesting birds in the world, possessing no millinery value and giving out a slightly musky odor, has been able to keep off the hats of former fashions and out of the stomachs of hungry Indians, and today is actually holding its own.

"Late at night I amused myself by dissecting the nest and resolved it into six hundred and twenty-three twigs, each of sufficient size and weight to necessitate a separate trip. Nature has provided the Hoatzin with weak flight and only a hiss instead of a voice, but as compensation the bird has inherited an infinite capacity for labor."

Curator Coates' Fish Column Is Twenty Years Old

Twenty years ago this April Curator-Aquarist Christopher Coates began writing a weekly column on tropical fish for the New York *Sun,* and when the *Sun* was merged with the *World-Telegram* the column was continued. During this period he has written at least a million words about tropical fish, Mr. Coates estimates.

The column appears every Friday in the newspaper, and from the very large correspondence it attracts, it appears to be of very real value to tropical fish fanciers.

* * *

Dr. Myron Gordon, the Zoological Society's geneticist, left on March 13 for a month's collecting trip in Honduras. He will study the fish fauna of the Atlantic drainage, an area that has not previously been studied, and hopes to determine whether platyfish and swordtails are found in the region. If so, they will be brought back as new strains for his genetic work.

* * *

The Bird Department has acquired a Red Bird of Paradise from W. J. C. Frost, an English aviculturist. It is the first Red Bird of Paradise we have had since 1939.

We Aid Other Aquariums

Although construction of our own new Aquarium will have to be postponed because of the present world situation, aquarium plans are being pushed elsewhere in the world, and in recent weeks Curator-Aquarist Coates has supplied data on the construction and maintenance of aquatic exhibits to officials of Lahore, Western Pakistan; Transvaal, Union of South Africa; and Vancover, Canada. Information has also been provided for the planning of a public aquarium in Nice. The Curator of the Aquarium and Zoo of East London, South Africa, and the Director of the Zoological Society of Amsterdam have also recently been in communication with Curator Coates regarding technical problems that have arisen in their aquariums.

QUESTION HOUSE SIDELIGHT

Impression of Herbert Knobloch getting ready to answer a question.

Mrs. Ben Jorj Harris, one of our members and a frequent visitor to the Zoological Park, has looked at some of our operations with a cartoonist's eye for the picturesque. Her latest drawing catches Herbert Knobloch, of our Education Department, in a gymnastic pose as he prepares to answer an inquiry at our Question House.

Spring Openings

As a general rule, the Children's Zoo re-opens on the Saturday before Easter Sunday, but the earliness of Easter this year makes it necessary to delay the re-opening until the weather becomes more settled. Consequently the Children's Zoo will open its gates for its eleventh season on Saturday, April 7.

Question House will reopen on Sunday, April 22, for its sixth season.

Again this year it will be impossible to re-open the Farm-in-the-Zoo because of road-blocking resulting from construction of the Bronx River Parkway directly alongside the Farm. However, plans are being made for construction of a parking field, to serve the Farm and adjacent parts of the Zoological Park, during the summer, and it is hoped that our exhibit of domestic animals can be resumed next year.

IN BRIEF

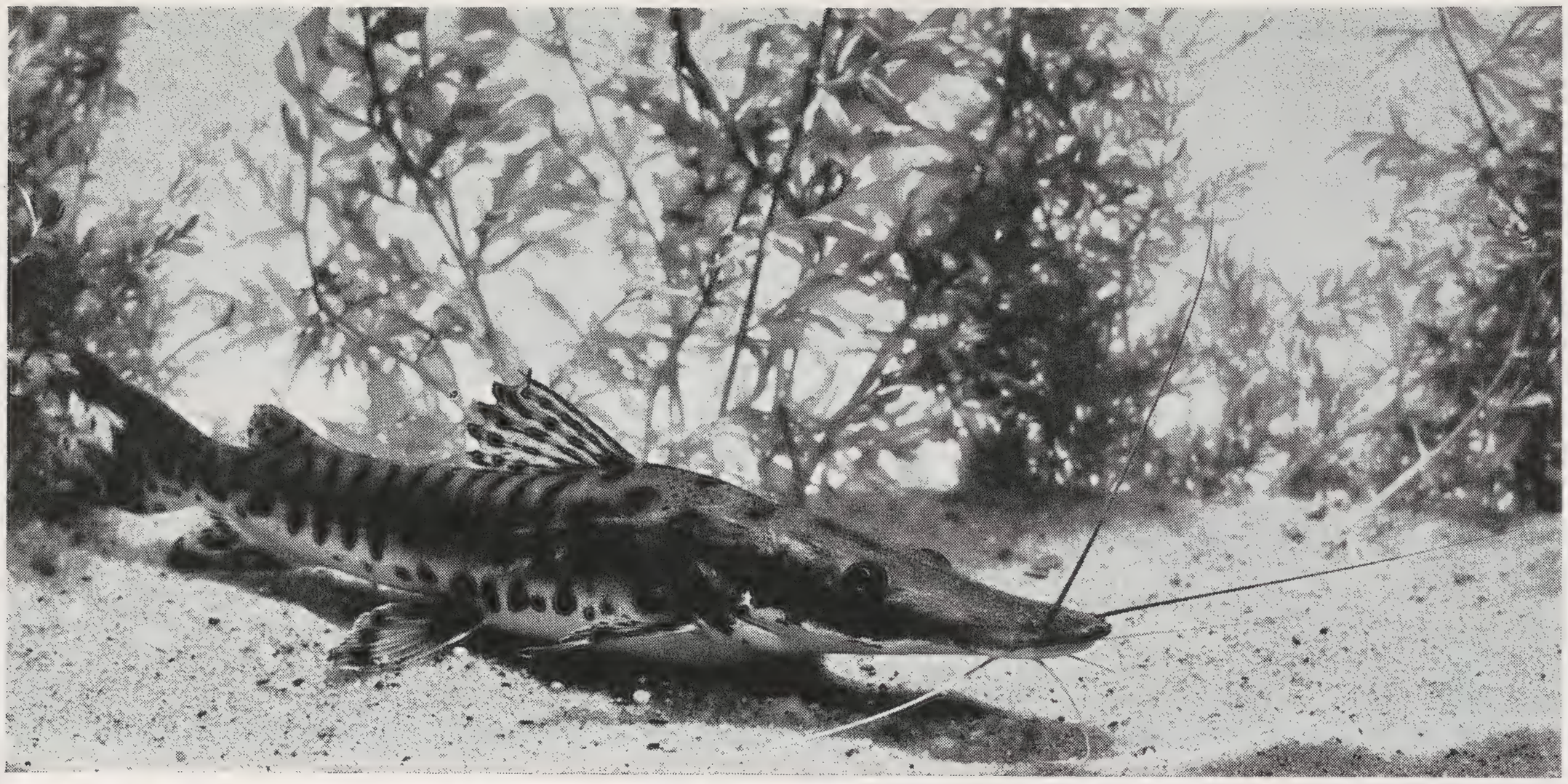
The three old Lions that have lived together on the African Plains since its opening in 1941 were delivered to the Philadelphia Zoo on February 20 and will be exhibited in that zoo's new Carnivore House. Our Lion Rock will start afresh with six young males as soon as the weather settles this spring.

* * *

Opossums and Raccoons are frequent visitors to the Zoological Park, presumably wandering down the Bronx River from the wooded parts of Westchester County. A gray Fox, even, was captured in the Zoo last year. Latest of these unwelcome guests (unwelcome because they are inclined to prey on birds in the outside enclosures) is a Weasel. Its presence was unsuspected until it was caught in a trap that had been set for rats at the Antelope House.

* * *

The coming of spring weather and the end of ice on our ponds should relieve the minds of visitors who have been alarmed by the freezing over of the Harbor Seal's pool. Unaware that "Sniffy," the seal, was keeping open a blow-hole about five inches in circumference, many visitors feared that the animal would suffocate under the ice. Their well-meaning efforts to break the ice by throwing rocks at it *might* have resulted



The Tiger Catfish—so-called because of its tiger-like striping and not because of any unusual ferocity—is a rare fish in aquarium collections, and this is the first we have exhibited. Its scientific name is* Pseudoplatystoma fasciatum; *its home is in the northern part of South America.

in injuring Sniffy. On some days during the winter it was necessary to post a man at the pool to explain that the Harbor Seal was perfectly all right and in no danger from the ice. A printed label, telling more in detail about the habits and habitat of the Harbor Seal (this one came from Denmark) finally took care of the matter.

* * *

Mimeographed leaflets telling about "The Care of Hill Mynas in Captivity" and about "Peafowl in Captivity" have been prepared by the General Curator's office, to answer the many inquiries received at the Zoological Park.

* * *

Only about 400 Black Ducks spent the winter on the Wildfowl Pond in the Zoological Park, in contrast to the 1,200 to 1,500 that ordinarily stay with us from fall until spring. The open, mild winter is of course the reason. Because of the plentifulness of food elsewhere, it has been difficult to induce the ducks to go into our banding traps, and very few birds have been banded in our cooperative project with the State Conservation Department.

* * *

Earlier in the winter the leader of a group of boys from Montclair, N. J., became ill while in the Zoological Park and since the children were obviously in difficulty because of the incapacitation of their leader, the whole party was taken home in the Zoo's station wagon. A cordial note of appreciation has been received, commenting that "Your organization appears to handle these emergencies ably and well."

* * *

The Mammal Department has acquired a young Schweinfurth's, or Long-haired, Chimpanzee. It is rare in collections.

* * *

Plans for the Third Conference on the Biology of Normal and Atypical Pigment Cell Growth, scheduled to be held in the Zoological Park this fall, are developing well.

* * *

A reprint edition of the Zoological Park's 258-page Guide Book has been issued, and is now available (at 75 cents) after being out of print for several months.

PUBLICATIONS OF INTEREST

THE GOLDFISH OF CHINA IN THE XVIII CENTURY. By George Hervey, F.Z.S. The China Society, London, 1950: 66 pages, 1 folded plate, 10/6d.

In the late 1700's there was sent from China to Paris a marvelouslv painted scroll, six meters in length, portraying in full size 92 varieties of goldfish; the scroll was accompanied by a *Notice* written in French and apparently translated by a Frenchman conversant with

Chinese from observations supplied by a Chinese student. From this material Billardon de Savigny published in 1780 the first European account of the goldfish. The present small book contains a black and white reproduction of the scroll, a charming translation of a copy of the original *Notice* which is now lost, and a translation of the abbreviated text of Billardon de Savigny's volume. The translation of the last few lines of the *Notice* suggests a code of conduct that all writers should emulate:

"Let there be no astonishment that we have said little about the goldfish Ch'ü-t'ou, Shui-yü, Nü-êrh, and Wên-yü. We have little leisure, they are not mentioned in the books; it is not prudent to write from hearsay, nor to repeat popular rumors. If we can find means to study them ourselves we shall be pleased to make good our omissions." — JOHN TEE-VAN.

LEBENDIGE SCHOENHEIT. 78 animal photographs by Jürg Klages. Rotapfel Verlag, Zurich, 1950.

European photographers of animals are fortunate. They work for a public which likes pictures of animals *as pictures of animals,* and not because the animal looks absurdly like a human being, or because a "cute" child is petting it. The result is that European photographers can produce a book like "Lebendige Schoenheit," and find a sale for it, without apology for the fact that it is only a collection of straight animal pictures and a brief text. Mr. Klages has a great and sure feeling for wild animals and for the moments in their lives when they are most typically themselves. There is nothing tricky or arty about these 78 photographs made in the zoological gardens of Zurich, Basle, Rotterdam and Copenhagen; they are simply astonishingly fine photographs.

WILD ANIMALS OF BRITAIN. By Oliver G. Pike. 231 pp., 8 pl. in color, many photographic illus. Macmillan, London, 1950. $3.75.

It is a pity this is not a better book, for really authoritative popular accounts of any group of animals (this book covers mammals, reptiles and amphibians) is always useful to naturalists. The author painstakingly tells us how to know a mammal when we see one, gives dental formulas for most of his mammals, quotes poetry and proverbs, offers personal observations and reports of scientific work — all good things in themselves, but rather a jumble as here presented. More serious is the attitude that allows him to state that snake venom has no effect on a hedgehog because the mammal's blood contains an antitoxin, and that an elephant ignores reptiles because it "knows" that its thick hide is a protection.

New Members of the New York Zoological Society

(Between January 1 and February 28)

Life

Sidney A. Mitchell
Miss Patricia Pierce
Morgan Pruyn Sanger
Harry Scherman
Frank B. Smithe

Contributing

A. Glen Acheson
Mrs. Henry H. Anderson
Boris A. Bakhmeteff
H. H. Barnes, Jr.
Miss J. Dorothy Borgstede
Frederic H. Brandi
Louis Britwitz
Dan P. Caulkins
James R. Chamberlain
Mrs. Arthur O. Choate
Mrs. Willard Church
Mrs. Harold Benjamin Clark
Mrs. R. J. Collier
G. Maurice Congdon
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George L. Eaton
Malcolm G. Field
William J. Graham
Wm. E. S. Griswold, Sr.
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Miss Antonia Hatvany
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Edwin L. Jacobs
Mrs. Warren Kinney
Miss Pauline Elizabeth Law
Charles Bispham Levey
Dr. David M. Levy
James McCosh Magie
Alan N. Mann
Erard A. Matthiessen
David H. McAlpin, Jr.
Miss Mildred McCormick
J. S. McCulloh
L. Gustam Moses
Miss Eleanor Moyer
Mrs. G. J. Guthrie Nicholson
Miss Marion Oeste
George J. Openhym
Miss Katharine DeB. Parsons
Charles E. Potts
Horry F. Prioleau
Dr. F. Morgan Pruyn
Curt H. Reisinger
George Roberts
Beverley R. Robinson
Hubert E. Rogers
William D. Stevens
Alexander M. Stewart
Arthur Hays Sulzberger
Gerard Swope
John Swope
Mrs. Lewis S. Thompson
Mrs. W. Roebling Vogeley
Charles G. Witherspoon
George M. Wolfson

Annual

Mrs. James Altemus
Mrs. Joseph F. Benaim
Walter R. Bradstreet
Miss Frances Browne
Mrs. Julian G. Buckley
Charles George Chaloux
Miss Angela Daugharty
Daniel F. Davison
Miss Barbara Ann Devine
A. Richard Diebold, Jr.
Philip Farnsworth
John Alan Friede
Dr. Mario Laurence Giampedraglia
Mrs. Zaidee Bliss Goodyear
Mrs. Paul Guenzel
Mrs. Caryl P. Haskins
Waldo M. Hatch
Henry F. Koster
Eric G. Matthews
R. J. Mechin
Dr. J. Lane Miller
Miss Janet C. Morrison
F. S. Pearson, 2nd
Martin G. Pierce
D. S. Reynolds
Edward Robinson
Mrs. Louis J. Rougon
Stanley Shinall
Mrs. Carlotta G. Smith
John H. Storer
Dr. Marion B. Sulzberger
Durand Taylor
Mrs. W. D. Ticknor
Stanley W. Ziminski

Will you *please* look at *Ce*cil!

CECIL PLATYPUS has been dating Penelope lately and we are that frenetic. Is it a serious attachment or just the result of propinquity? We can't tell — yet!

If so, will Cecil help build the nest? Will he share in the incubation of the eggs? Will he carry earthworms to his nestlings? 800 earthworms per day per nestling?

If you want to keep up with events–

Not just with Cecil and Penelope, but with all your other Zoo friends, keep up your membership in the Society. ANIMAL KINGDOM brings you all the news about the Zoo and the Society.

Spring is almost here! The Garden Party is only weeks away.

Don't let your membership lapse. Look it up now and see if you are still in good standing.

Don't miss the fun we are planning for you this coming season.
And let your friends in on it too. Send us their names.

MEMBERSHIP CHAIRMAN,
New York Zoological Society,
30 East 40th Street,
New York 16, N. Y.

NEW YORK ZOOLOGICAL SOCIETY

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ANIMAL KINGDOM

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THE MAGAZINE OF THE NEW YORK ZOOLOGICAL SOCIETY

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ANIMAL KINGDOM

Bulletin of the New York Zoological Society

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"A Guest in Its Country"

SEVERAL OF THE OLDER RELIGIONS are filled with a consciousness of the intimate relationship between man and all other living things. Buddha adopted some of the commandments of Jainism and of Brahmanism and evolved an ethic of compassion for everything that lives. It was natural that in the development of Christianity, in which so great emphasis is placed upon the uniqueness of the human soul, the Christian ethic should deal particularly with the relationship of man to man, and in far lesser degree to the bond between man and other forms of life. St. Francis of Assisi was an exception.

One can hope for and, indeed, sense a growing consciousness that man does not stand alone and apart from the natural world. Quite aside from its practical importance, this realization spells out for us the philosophy of the conservation movement and represents perhaps the principal ethic on which its growth must depend.

One of the great philosophers of the modern era, Albert Schweitzer, realizes with unusual clarity the unity of all living things. He doesn't even fear to be thought of as a sentimentalist. A young man by the name of Noel Gillespie, who went out to help Schweitzer on his second trip to Africa, was about to grind a beetle under his foot when he felt a hand on his shoulder and heard Schweitzer say, "Gently, Noel! Remember, you are a guest in its country."

Fairfield Osborn

JUN 1 1951

The Hazardous Industry of North Atlantic Sealing

ARCTIC ICEFLOES annually drift southward in springtime along the east coast of Labrador and Newfoundland. These fields of ice bear hundreds of thousands of seals and they in turn have been a source of wealth to Newfoundland, and indirectly to other countries, for well over a hundred years. During the southward drift many thousands of the younger seals and a few thousand of the older year classes are taken by skilled Newfoundland sealers who operate in ships especially constructed to prosecute this most hazardous of all deep sea adventures. The great hunt has been centered along the east coast of Newfoundland since its birth early in the Eighteenth Century.

It is therefore not surprising that biologists, and conservationists in particular, should at some time or other express concern about the stability of the species. That the species hunted have been able to survive in such large numbers during such a long period of time may seem adequate proof that no serious inroad has been made on the population. However, no statistics are available which show the present trend and no extensive population estimate had ever been attempted, up to 1950. In that year the Fisheries Research Board of Canada inaugurated a population survey in which a scouting plane was used and observers were placed on board the commercial fleet. The survey will continue in 1951.

Whatever results an investigation may reveal, it must be admitted that it is late in the day to formulate a broad program of conservation for an animal which in the past has been hunted with tremendous success by Scottish, Norwegian, Canadian, and in particular Newfoundland, sealers. Since 1812 close to 40,000,000 seals have been taken in the Newfoundland area alone and success in good measure still follows the Newfoundland (now Canadian) and Norwegian sealers who prosecute the Harp Seal industry.

The Hood Seal, once the mainstay in the livelihood of the west Greenlanders, is now thought to be in danger of extinction. Mr. Per Host, to whom I am much indebted for the illustrations in this article, made an aerial survey over the Newfoundland area during the 1950 season for the

Conservation Foundation. In his report Mr. Host states that the herds of Hood Seals of Newfoundland that about fifty years ago yielded as many as 60,000 pelts in a single season, seem to have almost disappeared.

The Newfoundland commercial catch records for the five years before and three years after World War II for the Hood Seal are as follows:

1934	106	1946 . . .	4,527
1935	501	1947 . . .	4,019
1936	953	1948 . . .	14,627
1937	81	1949 . . .	4,888
1938	372	1950 . . .	581

The indications are that some recuperation was made during the five years' virtually closed season of World War II when only one or two ships were annually engaged, and including 1943 when there was no fishery.

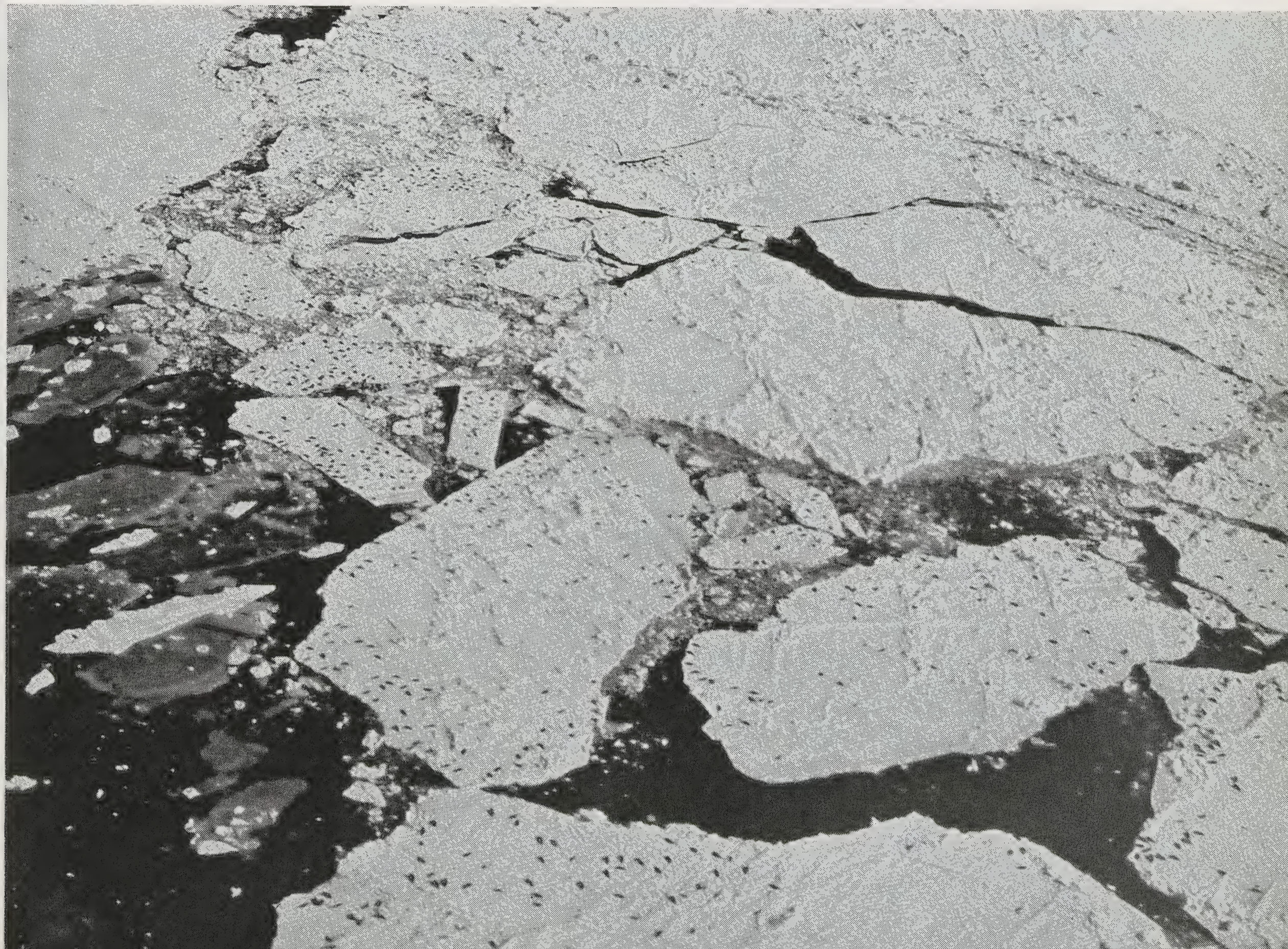
It must be noted in passing, however, that ships seldom go out of their way specifically to hunt Hood Seals since they live in scattered families and do not mix with the harps. The Harp Seals, on the other hand, are the prime object of the hunt since they are congregated and occur in large numbers. Thus, the Hood Seal may be said to be taken incidentally.

Conservation is a broad term and may have

By C. W. ANDREWS
Assistant Professor of Biology
New York University

Each of these tiny black dots is a Harp Seal, part of an immense herd on the Arctic ice floes. Hood Seals do not gather in such great herds. On opposite page—a "Whitecoat," or Harp Seal pup, at the age of two days.

All Photos by Per Host



several avenues of approach. Maximum use of all the products of the seal fishery certainly should be included here. During the long history of Newfoundland's sealfishery it is estimated that about 4,000,000 pounds of seal meat annually goes to the bottom of the ocean. Since 1900 approximately 200,000 seals have been taken each year and previous to 1900 as many as 685,000 were taken in a single season. The voyage is prosecuted for the fat (oil) and skins, the carcass being separated and left on the ice-floe. Today when protein foods are becoming more and more expensive it seems that some use ought to be sought for this by-product – perhaps as a form of food in the field of animal husbandry. In the food cycle of the sea, of course, it serves a good purpose but in the economy of man it may serve a better purpose. A market for the by-product would result in fewer seals being taken annually, since carcasses would displace the cargo space normally taken by several thousand pelts.

At the time of writing two Newfoundland ships have returned from the 1951 sealing voyage with full cargoes of 32,000 and 37,000 pelts respectively. The captains of both ships are united in their complaints about an important matter relating directly to the conservation of the seals. Both say that killing takes place too early in March. This year, for example, on the first day of killing the young harps weighed only 12 pounds and one captain reports that he has enough pelts for a load and a half had the seals been taken a week or more later. Before World War II Newfoundland law permitted the sealers to begin killing on March 13 but since the war the hunt has become international and the Newfoundland law no longer holds. Ships arrive in the pack before the old seals have pupped and the crews start killing soon after the young are born. The captains here quoted, though forced

to begin killing because of the competition from other ships, strongly urge an international agreement establishing a killing date not earlier than March 15. Such an agreement would mean that the average weight of young seals would be increased to about 50 pounds and this again would result in fewer seals being taken.

In the past, too, it has been imperative for the Newfoundland sealer to take large numbers of seals if he was to gain even small returns for his labor. Witness, for example, the following capacity cargoes and the comparatively low shares of the crew members.

Year	*Ship*	*Seals*	*Crew Share*
1888	*Neptune*	42,242	$ 77.17
1899	*Vanguard*	22,619	41.65
1900	*Vanguard*	25,116	46.75
1901	*Vanguard*	26,525	32.45
1902	*Vanguard*	25,707	54.60
1903	*Vanguard*	24,238	58.13
1904	*Vanguard*	20,640	52.36
1910	*Florizel*	49,069	148.36
1916	*Eagle*	33,400	133.78
1926	*Beothic*	48,421	124.66
1933	*Ungava*	49,285	80.36
1933	*Imogene*	55,636	93.48

Crew members share in one-third of the net value of the cargo by weight. This, plus the fact that the seal skins are included in the weight at the same rate as the fat (9¢ per lb. in 1951), further leads to low returns.

Since World War II higher wages have been

teel ships are powerful ice breakers. Most of them ave a very large cargo capacity, up to sixty thou- and pelts. This is the M.S. Theron of Halifax in the ce of the Gulf of St. Lawrence in March, 1950.

earned — as much as $350 per man for a single voyage. This is a direct result of employing smaller ships with smaller crews than in the earlier years of the steam fleet. The average share per man in the 1947 sealing season, when 1,477 men sailed from Newfoundland, was $210 and in 1948 when 1,035 men sailed the average share was $130. Crew members of the first ship to return supplement their earnings by as much as $100 on the sale of seal flippers — a very popular dish locally. However, demand for flippers at the high price soon falls off and thereafter the supplementary earnings are negligible. The bulk of income from the catch comes from the oil, of soap and lubricating quality, and the skins which are used for industrial and commercial leather — for luggage, wallets, belts and the like.

Interest in the industry is mounting yearly since the war and in 1948 twenty-five ships sailed from Newfoundland plus a dozen or so from Norway. In 1951 about fifteen operated from Newfoundland, five from Halifax, Nova Scotia, and about a dozen from Norway.

Two species, *Phoca groenlandica,* the Harp Seal, and *Cystophora cristata,* the Hood Seal, are hunted.

The Harp Seals, besides being by far the most numerous, are most sought after because of their high oil content. Harp Seals make up about 95 per cent. of the commercial catch. The adult harp is from five to seven feet in length and weighs from four to five hundred pounds. At birth it weighs about eight pounds and measures about two and one-half feet in length. It is then covered with a white stiff wool which is replaced by hair within three weeks. "Whitecoats," as the young harps are called by the sealers, are quite helpless during the first two or three weeks. They lie almost motionless on the ice during this period, cared for and fed by parents whose parental instincts are notably strong. They thrive best in cold and stormy weather, adding to their weight from one to two pounds per day. The average weight at three weeks is about 50 pounds. Prior to World War II it was during the third and fourth week in the life of the seal that they were taken by the hunters. In the fourth and fifth week the young harps tend to become much more active, move off the ice into the water, begin to seek their own food and soon are forsaken by their parents. At this time the white coat is covered with tiny dark spots which give it a grayish color. They are then called "Ragged Jackets" by the sealers. Harps are said to bear young for the first time when four years old. During their second and third years they are called "Bedlamers" (from the French "bête de la mer").

The Hood Seal receives its name from a peculiar loose protective skin on the dorsal side of the head of the male. When angry, this rubber-like cap or "hood" is puffed out like an inflated

sac. The adult hood is larger than the adult harp, measuring about eight feet in length and weighing from seven to eight hundred pounds. It has a grayish color with brown spots. At birth the Hood Seal weighs from eight to twelve pounds. It is more active than the young harp at birth and it has less protective coloration. It remains on ice about four weeks. The adult Hood Seal is a fighter and resists attack ferociously. In recent years it makes up less than 10 per cent. of the total catch.

The details of harp and hood migration are not well known. However, the general migratory path seems to be fairly well established. During migration they range from Baffin Bay, the west and east coast of Greenland in the north, to the Grand Banks of Newfoundland in the south — a distance of approximately two thousand miles.

During June, July and August, harps are found in Baffin Bay and a few are said to frequent the west coast of Greenland. They have also been seen at the entrance to the Hudson Straits early in August, probably migrating into Hudson's Bay and the west coast of Baffin Land. Harps begin their southward journey towards the end of September; i.e., when new ice begins to form in Baffin Bay. Food is said to be scarce at this time and the animals are somewhat thin.

Meanwhile, Hood Seals are migrating southward along the Greenland coast to Cape Farewell whence they cross over to the Labrador coast, a distance of about five hundred miles, in open sea. The harps continue south and both species are in the vicinity of the Straits of Belle Isle by late December. The hoods do not mix with the harps but parallel them to the east in the southward journey.

Harp Seals travel comparatively slowly along the Labrador coast and they may leisurely frequent inlets and bays, probably in search of food. This behavior is confirmed by the fact that during November of 1947 thousands of Harp Seals swam into Nain Bay where, during a night of heavy frost, several inches of ice formed, thus preventing the seals from keeping open their "blowing holes" by which they could get access to the waters below. At least three hundred were captured and killed by the natives on the following day.

Generally all seals have passed the Straits of Belle Isle by December 30 and they have been seen off St. John's early in January.

Some of the harps turn west in the Straits of Belle Isle and migrate into the Gulf of St. Lawrence. These are said to be shorter than the harps that continue along the east coast. Some hoods also migrate into the Gulf at the same time. The main body of seals, however, continues along the east coast of Newfoundland, a few being caught in nets by fishermen in Notre Dame and Bonavista Bays. Seals arrive on the Grand Banks presumably about January 10, and feed voraciously on cod, herring and caplin, etc. It is thought that cod forms their principal diet and they are known to gain considerable weight while in this area.

Early in February the seals begin their northward migration. They are said to travel north fast and by February 18 they are again in the general region of the Straits of Belle Isle. Here they meet the "whelping" ice; i.e., ice newly formed off the coast of Labrador and occurring in very large, thin (3 to 4 inches in thickness) sheets. Harp Seals seek this particular form of ice on which to bear their young. The fields of whelping ice gradually thicken as it drifts south and around the periphery a barrier of even greater thickness forms — a kind of natural protection which the most powerful ice breakers sometimes find difficult to penetrate.

Parent seals keep "blowing" holes open through the whelping ice for access to food below. Sealers call February 28 the birthday of the "Whitecoats." The harp family consists of a male and female parent and a single pup. Twins are very rare. The families congregate in large herds or patches which may vary from 50,000 to 150,000 individuals per patch.

Hood Seals seek rough, thick, ice on which to pup or whelp. This they find about thirty miles east of the harps. Hood Seals are also found in families during the pupping season, a single family consisting of the male and female parent and the single pup. The families do not congregate as do the harps, but are separated from each other by 100 yards or more.

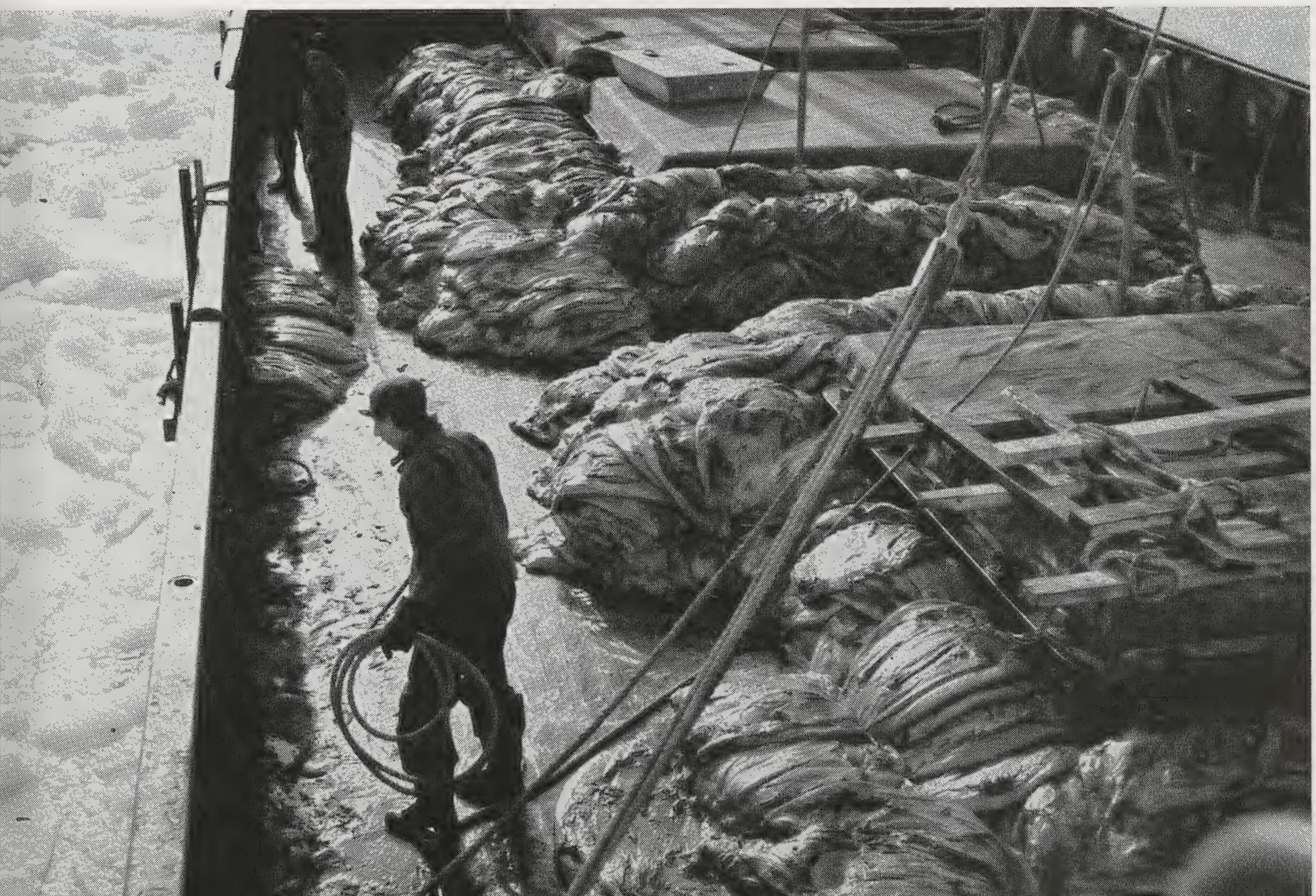
During the pupping season the seals drift south again on the icefloes which are carried south by the Labrador Current, the prevailing winds tending to modify the drift somewhat. It is

gestation period begins during this phase of the migration. When off the coast of Labrador the hoods again set out for the Greenland coast while the harps continue north to Baffin Land.

An unknown number of seals, perhaps several thousands, is said to migrate north and south in Hudson's Bay. Little is known about this herd and it is perhaps not too much to assume that other herds may also exist in neighboring areas of the vast northland.

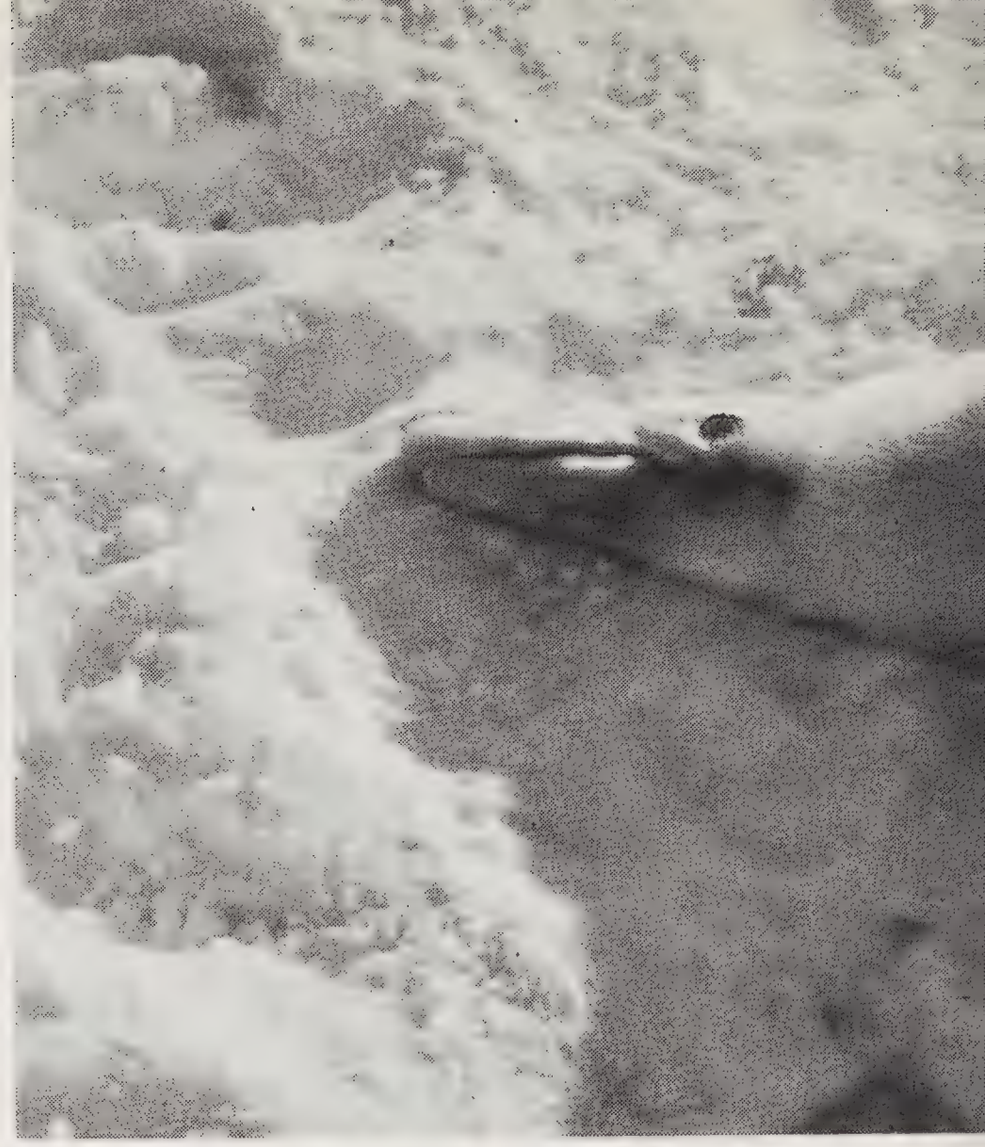
The early sealfishery in Newfoundland was conducted from the shore in small open boats by means of nets. Decked boats, rigged like schooners, came into use about 1700. These boats ventured farther from land than the open boats and in the early Nineteenth Century no fewer than 400 sailing vessels ranging in size from 100 to 300 tons annually engaged in the hunt. These early sailing vessels in all probability blazed the trail followed by larger ships today. In 1863 the steam fleet was introduced. This fleet consisted of large wooden ships of 400 to 800 tons, equipped with steam and sail. Among these boats were such ships as the *Aurora, Terra Nova* and *Thetis,* famous in Arctic and Antarctic exploration. This type of ship continued in use until the late 1930s, several having been lost in the meantime. Ships of the steam fleet had a crew of about 150 men per ship and a carrying capacity of 15,000 to 30,000 pelts per ship. Late in the Nineteenth Century the steel ship was introduced into the sealfishery. These ships ranged in size from 1,000 to 3,000 tons, had a crew of 150 to 250 men and a carrying capacity of 40,000 to 60,000 pelts. Steel ships were powerful ice breakers, and the highest number of pelts secured by any one ship of its kind in a single voyage was well over fifty thousand. During the past fifty years, approximately, the sealing fleet consisted of both wooden and steel ships, the maximum number engaged in any one year being about thirty, of which not more than half a dozen were steel ships. Gradually during the past twenty-five years the fleet has dwindled, and when World War II started only seven ships were engaged in the hunt. Since World War II, during which time there was practically no sealfishery, the wooden motor vessel has become increasingly popular. This ship varies in size from 200 to 300 tons, carries a crew of 40 to 80 men and has a carrying capacity of 10,000 to 15,000 pelts. In 1948 twenty-one such small ships and four steamers prosecuted the sealfishery from Newfoundland.

The sailing ship was generally owned by a small merchant who often captained the ship himself at the sealfishery. Steamers were much more expensive to build and operate. Thus ownership passed from the small owner to the more wealthy class.



A typical sealing ship is mastered by a sealing captain who generally has several years' sealing experience before he is given command. Other officers include a navigator, first and second officers, and some other junior officers. The crew is divided into "watches" of about 40 men each for hunting purposes. Each watch is supervised by a "master of the watch." Other members of the crew include the engineers and cooking staff.

Below—During an investigation of sealing operations for the Conservation Foundation, Harp Seal pups were tagged with a metal tag clipped to the tail. Here such a tag is being affixed; return of the tags will give a better clue to the migration routes of the animals. At right—A Harp Seal pup with a tag attached. It seemed not to mind being handled.



When a ship reaches the seal herd the crew either whole or in part is ordered on ice by the captain. They are then supervised by the master of the watch while the ship, with a skeleton crew or more, may move on to seek new areas of the patch. Each sealer is equipped with a lunch kit; a club, for batting seals; a knife, for stripping the pelt from the carcass; and a hauling rope, for dragging the pelt to the required spot.

Young seals are killed by striking a blow on the head with a club or gaff. The seal is then pelted; i.e., the carcass is removed, and the pelt is dragged to a place (called a "pan") designated by the master of the watch while the carcass remains on the ice to sink to the bottom when the ice melts farther south. The pelts are piled in pans of about 300 each. A flag with the ship's name is hoisted in the pan, thus directing the ship to the pelts, after which they are hoisted on board and stowed down in ice.

If insufficient young seals are secured the sealers resort to rifles and shoot seals of the two, three and older year classes. The proportion of seals taken in this manner is small.

The sealer's life is full of hardship and danger and only the skilled sealer would dare visit the ice pack year after year. He is constantly at the mercy of wind, weather and ice. Sometimes men, while hunting on ice away from the ship, are separated from each other and from their ship by blinding snowstorms and severe frost. While many ships have been lost, fortunately only two severe disasters resulting in loss of life have occurred in the history of the sealfishery. Not infrequently ships are caught by Arctic ice and crushed as in a vise, only to sink beneath the waves when the ice pressure is released. When accidents of this nature occur crews generally have time to secure food and tents from the sinking ship and they then set up shelters on the ice-floe until rescue ships arrive.

Aeroplanes have been used in recent years to locate the seal herds. The planes have been small and thus they have been limited in their range. They have, however, proved of invaluable assistance in many cases and it is expected that the aeroplane will soon become part of the sealer's regular equipment.

The record shows that for 26 non-consecutive years in the period 1830-1881 inclusive, i.e., a range of 52 years, the total catch exceeded 400,000 annually. In thirteen years of the same period the catch exceeded 500,000 annually, and in three years (1840, 1843 and 1844) the catch reached 631,385, 651,370 and 685,530 respectively.

During the next 52 years, 1882-1934, the catch never exceeded 400,000 annually. For ten years, however, it was well over 300,000, but whereas in the first 52 years' period the catch fell below 200,000 in two years only (1864 and 1874), during the latter 52 years it fell below 200,000 during 19 non-consecutive years.

The total catch for the period 1812-1940 was in the vicinity of 40,000,000 seals. Young harps make up by far the bulk of the catch, the range being from 65 to 94 per cent. Bedlamers, i.e., two- and three-year-old seals, comprise 9 to 28 per cent. and old harps from 2 to 8 per cent.

The total number of hoods taken during the 1930s rarely exceeded 2 per cent. of the total catch. In 1947, however, hoods made up 4 per cent. and in 1948 10 per cent. of the total catch.

The commercial catch records suggest a declining seal population since about the year 1880. However, several factors are involved which would lead one to think that the commercial catch is not necessarily an index to the relative size of the population as a whole. Among these factors are:

1. The introduction of the steam fleet in 1863 which caused the industry to concentrate gradually in the hands of about a half dozen merchants. Only such people could undertake the

The "spotting" plane used by the Canadian Fisheries had to make take-offs and landings under difficulties.

financial risks involved in sending such expensive ships to the hunt. Steamers were also more attractive to the sealers since many of the hardships of sailing ships were removed. Thus the sailing ship declined and with it the number of men employed in the sealfishery.

2. The possibility that the Newfoundland area may not represent the full extent of the breeding grounds. Experienced sealers believe that other patches exist along the east and north coasts of Labrador. During the past 100 years ships have seldom gone north of southern Labrador in search of seals, because of the limited time at their disposal and the heavy ice encountered.

3. The tendency of steamers to hunt only seals that are congregated, since valuable time would be lost in picking up scattered seals, thus losing the advantage possessed by steam. Sailing ships, on the other hand, could take scattered seals without disadvantage since they generally progressed much more slowly than steamships. Thus it would seem that an increase in small ships could prosecute the sealfishery with gain even though the main patches are not located, whereas steamers could gainfully operate only when the main patches are located, and this has not always been the case.

On the other hand, one must not be blinded to the possibility that the taking of such large numbers of animals annually up to 1910, at least, may not have a detrimental effect upon the population as a whole. Captain Abram Kean, O.B.E., probably the most experienced captain in the history of Newfoundland's sealfishery, expressed concern over the apparent declining population during the Nineteen-thirties. Captain Kean made at least fifty voyages to the sealfishery as a sealing captain.

The years of World War II must have had a decided effect on population increase in the North Atlantic Seal, since ships were not available for the hunt between 1941 and 1946. The powerful ice breakers in use just before the war soon became part of the merchant marine and were diverted elsewhere.

If we assume that 400,000 adult seals constituted the population at the end of the 1940 pupping season (since about 150,000 young seals were taken in that year and it is very improbable that all the available young were captured), then with a 10 per cent. yearly increase during the above-mentioned period of seven years, the adult population should be about 700,000. Assuming also a 50-50 sex ratio and that each female gives birth to one pup, as is generally thought, then in 1947 the total population should have been at least one million seals. This is mere speculation, however. The ocean is wide and its many factors affecting animal populations are apt to play havoc with any such armchair predictions, especially predictions based on little factual data.

It seems that a complete population estimate of the North Atlantic Harp and Hood Seals is

(*Continued on Page* 94)

There's Still a Chance for the Wisent

By WILLIAM BRIDGES

ALMOST FIFTY YEARS AGO, when the American Bison was close to its lowest ebb, the New York Zoological Park exhibited a pair of animals that appeared to be in a fairly stable state — a pair of European Bison, or Wisents. Since those beginning-of-the-century days the situations of the two animals have reversed themselves, and now it is the American Bison that is safe from extinction (barring some unlikely epidemic or catastrophe) while the Wisent is closer to the vanishing point than the American Bison ever was.

Nevertheless, the Wisent has a chance. A chance, that is, unless there is another world war. World Wars I and II brought Europe's largest mammal almost to extinction and a World War III would probably finish the job. But in the meantime, the herds are showing a small but encouraging increase.

Up-to-the-minute figures are not available, but the latest "Pedigree Book of the European Bison," dated January 1, 1949, lists 52 males and 67 females, to a total of 119 animals, of pure-blood stock in ten European countries.

Two years earlier, on January 1, 1947, the census listed only 93 Wisents (a figure that later was corrected to 95).

Dr. Jan Zabinski of Warsaw, editor of the "Pedigree Book," had the optimism to report in 1947 that:

"It is thus evident that by applying an adequate system of protection in peacetime, one may be certain of the efficacy of the efforts devoted to the propagation of the European Bison and to its conservation — efforts justified by the moral obligation of each generation to transmit to the following generation an intact patrimony."

In view of the optimism of Dr. Zabinski, who is so close to the current situation and to the continuing efforts to increase the size of the herds, we are justified in hoping that the European Bison will, if not follow the steep upward grade to security that was taken by the American Bison under protection, at least hold its own in these uneasy times and perhaps even climb to a more secure position.

The latest available census of the Wisent, that of January 1, 1949, reveals the following distribution of pure-blooded Wisents:

Country	*Male*	*Female*
Poland	21	36
Germany	6	11
Soviet Union	7	6
Holland	1	5
Switzerland	1	—
Italy	1	—
Sweden	13	8
Denmark	1	—
England	—	1
Czechoslovakia	1	—
	52	67

Between the beginnings of 1947 and 1949, thirty-three calves were born. Nine died but there was a net gain of 24 animals, which argues vitality and efficient protection. It is, of course, possible or even probable that a sizeable increase by births has continued to take place in the two and a half years since the last report was made by Dr. Zabinski.

A graphic account of the vicissitudes of the

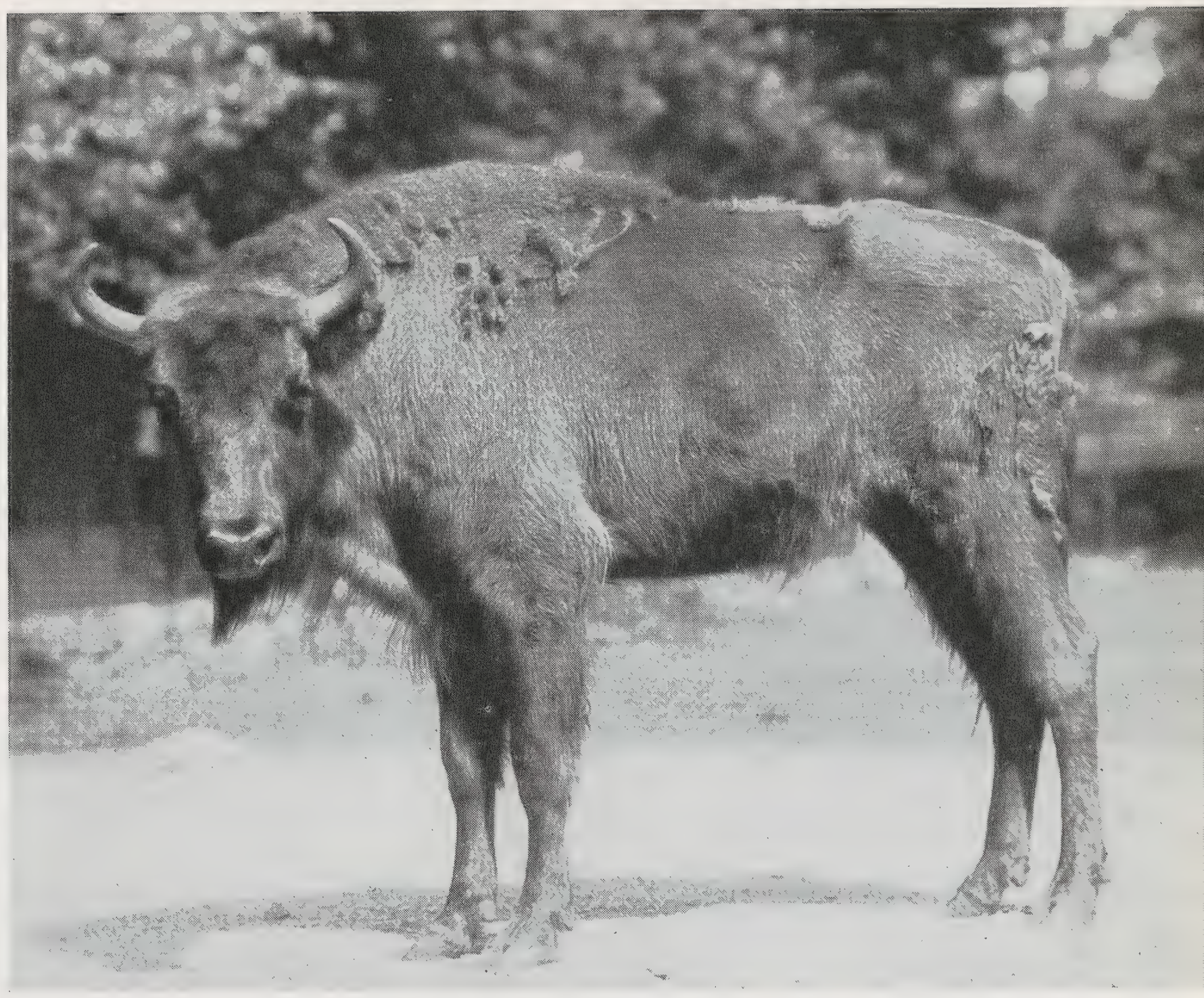
Polish herd during the recent war was given by E. N. Munns, of the Division of Forest Influences of the U. S. Forest Service, in the August, 1948, *Journal of Mammalogy*. Writing in January of that year, Mr. Munns stated that he had just returned from Poland, and while there had discussed the status of the wisents with the Polish foresters.

"Some eighteen years ago," he wrote, "I visited Bialowieza [the Polish wisent preserve]. This immense old-growth forest was the natural home of the wisents in recent centuries. It ran from the sandy pine lands near Bialystok in the east and north to the Pripet marshes in the east, a vast island virtually trackless and unknown except to the foresters and game keepers. It produced alder, birch, willow, beech, ash, and oak, which furnished ample browse, in addition to a wild oak and other herbs which are the normal food of these bison during the summer period.

The Wisent is unlike the American Bison in many ways: it is higher at the shoulder, has longer legs, is more "streamlined." This is a bull once in the Duke of Bedford's herd.

"Soon after the outbreak of World War II, the Polish Chief Forester, Jan Miklasewski, undertook to preserve the wisent. He sent his Chief Inspector and the Regional Forester at Bialystok to Moscow to consult with the Soviet authorities. After considerable negotiations, the Russians agreed to the proposals and made any killing of the wisent punishable by death. Signs to this effect were posted throughout the Bialowieza Forest and Russian speaking Polish foresters were assigned the task of watching over and caring for the animals. During the Russian occupation of eastern Poland only one wisent was killed, a crime for which three Russian soldiers were executed.

"The first German attack upon the Russians caught the latter by surprise and they retreated in disorder far to the east of the Bialowieza Forest. The Polish foresters who were protecting the herd were also placed in jeopardy by the advancing Germans. One was sent to a concentration camp before he could get a hearing. Finally, a German officer was found who was personally interested enough to call attention to the authorities on the need for preserving the ani-



The female of a pair of Wisents about five years old, sold to the Zoological Society in 1903 by the Prince of Pless from his herd in Silesia. The Prince wrote a postcard to the Zoo, offering the animals.

mals. Again signs were put up, this time in German, forbidding the killing of the wisent. However, this action was not taken until after several of the animals had been killed. This time German game keepers were substituted for the Poles, but one Polish forester, disguised as a peasant, continued to watch as best he could over the herd.

"News of the wisents reached the Chancellery in Berlin. Hitler asked that some of the animals be caught and sent to Berlin. Just how many were so shipped no one now appears to know, but at least five and possibly as many as ten were taken at one time. The Poles believe that perhaps twenty-five animals in all were taken to Germany during the occupation.

The Russian return drove out the Germans and again the animals were in danger. However, the Polish forester came out of hiding and took over the job of protecting the animals. This time he was successful in keeping out all intruders for he still had preserved the decree issued by the Russians earlier.

"The 'Curzon Line' decided upon at Yalta gave to Soviet Russia a considerable part of the territory formerly in pre-war Poland. This line as surveyed passed through the wisent enclosure. Again the same Polish forester, now Regional Forester at Bialystok, engineered a slight jog in the line which kept virtually all the 140-acre paddock inside present-day Poland.

"The Bialowieza Forest herd now numbers nineteen animals, eight males and eleven females, including seven calves under two or three years. Whether the Poles can keep this herd intact remains to be seen for Russia is now demanding five calves as its share of reparations. This transfer the Poles are currently vigorously protesting, but the Polish government being what it is, there may be no choice.

"Another herd of wisents is in Silesia near Pszczyna. Here are twenty-five animals. Five of these are calves. None of this herd suffered during the war. One forester jocularly said the reason was that the Germans were too busy exterminating Poles at nearby Oswiecim to bother with a few strange animals. However, the Polish foresters who were in charge of the herd were not so fortunate. Polish foresters assert that the only predatory animals they fear are wolves and bears. Every year wolves are killed about the tight enclosures and occasionally bears are troublesome in the spring."

A Photographic Report
By Sam Dunton

BABY-TIME IN THE ZOO

The first baby in the new Great Apes House was this White-handed Gibbon — the third birth for this pair. It arrived on March 29.

"Erh" (the Chinese word for "Number Two") is a Pere David Deer, born on March 31. Erh is a female; a male was born in April, 1949.

On April 9 we welcomed a baby Slow Loris. Last year's youngster and the mother and father are usually rolled together, as here.

This sturdy young animal is a Gayal calf, born on May 2. It is light brown in color, although its mother's baby coat of hair was bright red.

The Scaled Wrestlers of the Australian Bush

By DAVID FLEAY

ONE AFTERNOON in late October last, we were advancing quietly over Bull Plain, a sandy, red soil stretch not many miles below the Lachlan – Murrumbidgee river confluence in the remote back country of New South Wales. Partly inundated by great flood waters – the highest for more than fifty years – Bull Plain was at that time a great snake stronghold, and the eager members of our party walked spread out in the warm sunshine to stalk the basking serpents and capture them alive.

Suddenly Peter Jones hailed distantly and began to point and beckon. The focus of his attention appeared to be off through the spreading red gums towards the swamp water. At first we thought he was indicating a bunch of Emus, but long before arriving we beheld the cause of his excitement. There, in a clear open space not far from a rabbit-riddled blackfellows' midden (aborigines' cooking mound composed of the charcoal, ash and food debris of centuries), writhed and struggled two tremendous Black Snakes (*Pseudechis porphyriacus*). Plaited together like thick ropes as they were, it was the continually swaying heads and necks of these heavy-bodied fellows, raised at least a foot above ground, that could be plainly seen from a distance of fifty yards.

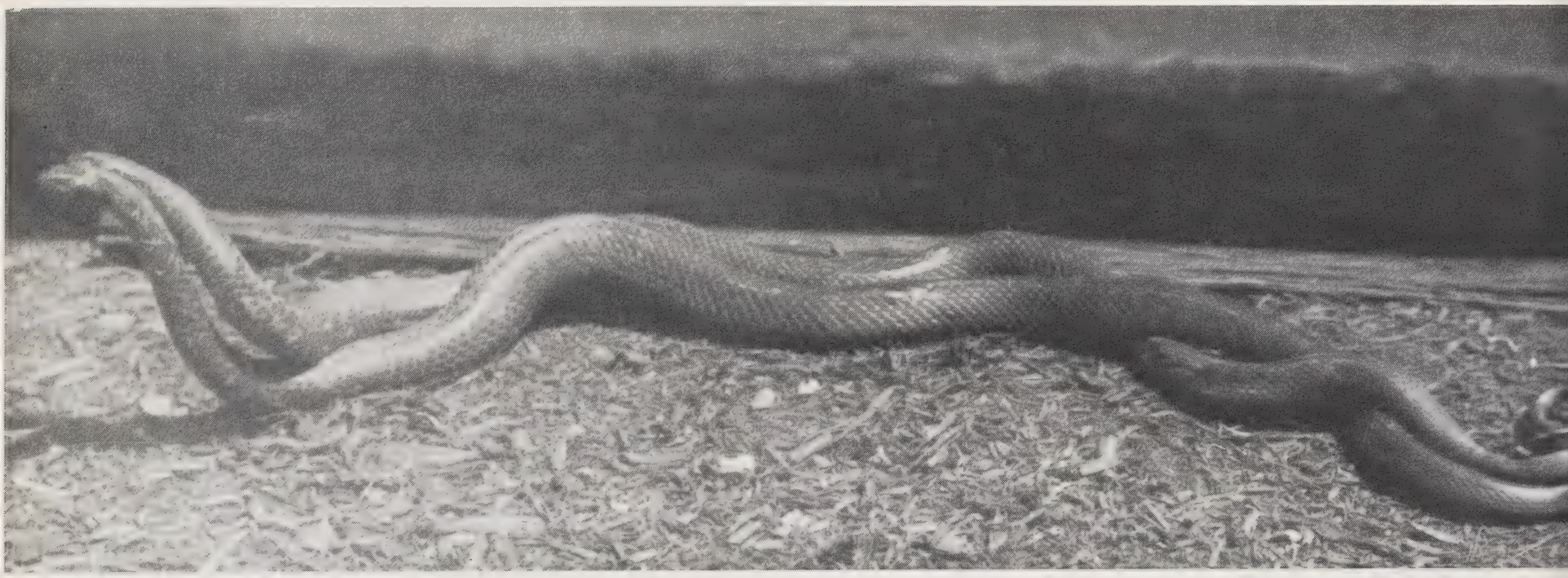
So completely were they engrossed that they continued twisting, rolling and hissing even when Tom Bradbury, Peter Jones and I stood around them. Their scales were worn and shabby, and gasping breath indicated the strenuous nature of the struggle. Evidently the neighboring rabbit warren in the black soil of the aborigines' kitchen midden was the home of one of them, for a shed skin lay among the inevitable nettles. It was little trouble to seize the tails of the preoccupied six-footers – upon which they did at last relinquish their strangleholds – and drop them into the snake bag as prisoners. One of the beauties weighed four and a half pounds and the other only four ounces less. Both were redolent of the strong odor peculiar to the species. However, that was not the end of the struggle, not by any means! Next morning they fought in the bag itself and had to be separated for the sake of smaller captives. Two weeks later they struggled again in an enclosure at my home. Those two snakes certainly bore one another an extra special grudge.

Far less common than the Black Snakes were the Brown Snakes, (*Demansia textilis*), but on isolated Murrumbidgee sand banks on this same trip quite a scattering of these fast and dangerous fellows was found and some forty were captured. On one never-to-be-forgotten morning, following innumerable encounters with flood-bound foxes, rabbits, sand goannas and wild pigs and their suckers, a great Brown Snake was cornered away from his well-worn subterranean retreat. Tom and Kevin Bradbury, Roy Goodisson, Peter Jones, Roy Irving, Alan Lewis and I danced, feinted and continually warded off the charging reptile with sticks. With its neck curved in compressed S bends, it struck furiously at one and then at another of those of us crowding it. At one stage

So engrossed were these Brown Snakes (each more than 6 feet long) in their battle that they were unaware of the photographer until the camera clicked. This is the first photograph of such a fight

All Photos by David Fleay

it shot between Mr. Goodisson's legs, causing him to execute airy steps creditable even to a ballet dancer. Eventually a hot, perspiring and somewhat relieved crowd rested about the heaving bag, collecting scattered wits and discussing the lively campaign. No one was willing to put the tape on that fellow until the comparative cold of night, when, to the accompaniment of roaring frogs and the sepulchral booming of bitterns all about, we did so, finding him to measure six feet, seven and a quarter inches.



Two male Black Snakes in the "on guard" position that is preliminary to a fight. At this stage, each is trying for a kind of head lock around the other.

Another big Brown with a six-foot-three-inch head-to-tail length was collected next day, and from these two big fellows we learned that males of this widely spread, fast-moving species also participate in spring feuding. It was two weeks, however, before combat was joined and then the pace was fast and furious. As one would expect in a species that habitually throws tight coils about its victims until the venom is effective, the rope plaiting grip of the rivals about one another was even more severe than in the case of the Black Snake, and a greater length of the fore part of the body remained free and upstanding as the reptiles sparred for the grip that precipitated the writhing, rolling and gasping of strenuous combat. The battle continued until the combatants were so exhausted that they lay with heads and necks prostrate, but even then the latter halves of their bodies still exerted cruel pressure.

A careful study of our snakes over a number of years, strengthened by the unique opportunities to observe them among the swamps and ridges of the flooded Murrumbidgee in the spring of 1950, enables me to chronicle these apparently unrecognized and hitherto misunderstood habits. The mating season of both the Black and the Brown Snakes is in the Australian spring – October and November – and on suitably warm and consequently active days, bitter struggles occur between males over the favor of some glistening-scaled female, or when one trespasses upon another's territory – the two causes being interrelated in any case. Jealousy does rear its ugly head even among snakes! But here is a very strange thing to relate. Though I have grown up and "lived" with Copperheads and Tiger Snakes, no evidence has ever accumulated to show that combat occurs between the males in either of these well known Australian species.

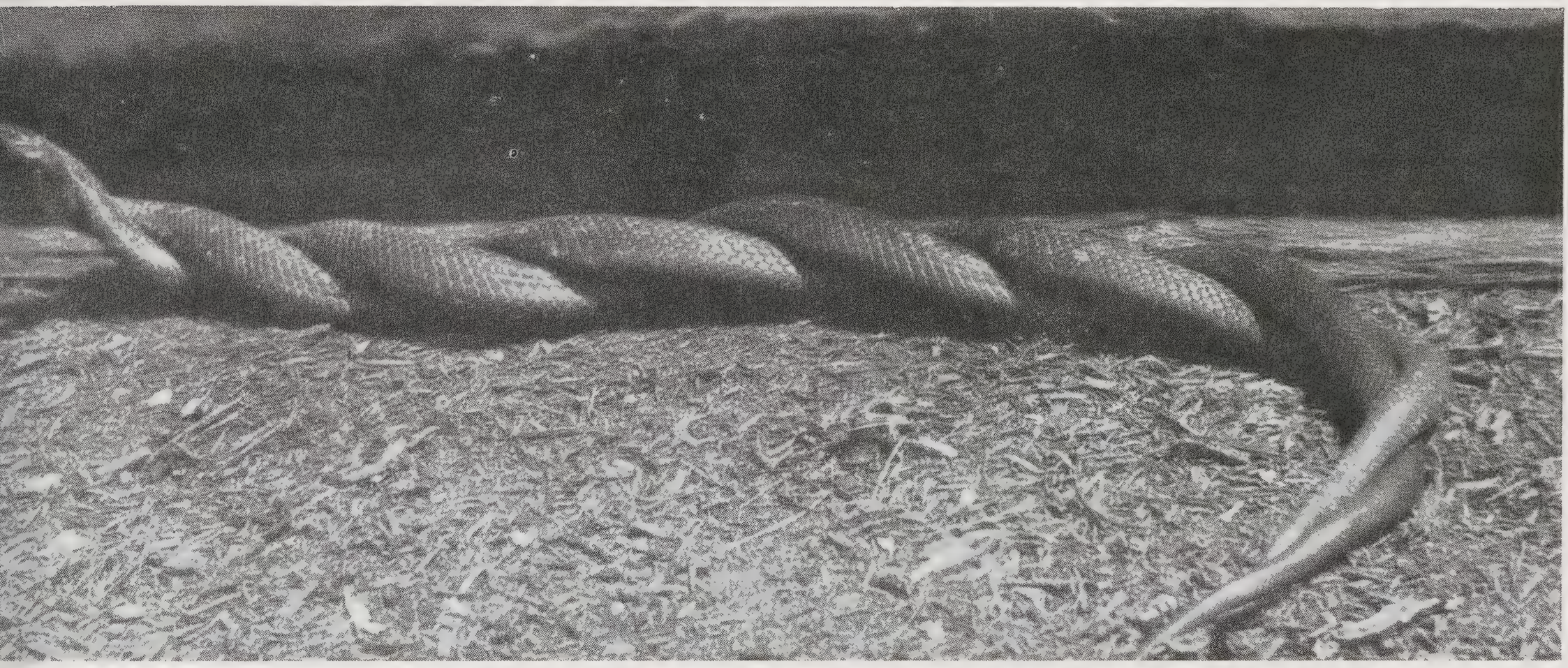
I first observed active rivalry among Black Snakes in September, 1936. In that year, on a trip to the Murray River near Tocumwal, N.S.W., we had collected some big Black Snakes in the red gum border country and returned with them to the open air snake yard of the Zoological Gardens in Melbourne. Newly awakened from winter sleep, these big reptiles averaged between five and six feet. In fact, one of the forty-five blue-black, red-bellied captives measured seventy-two inches, with a girth of eight inches. For the previous two years smaller Black Snakes and

other species had been exhibited together in this snake pit. I had made a good many interesting observations on them, including the devouring of newly-born young snakes by the frogs (*Hyla aurea*) provided as prey, but it was not until the advent of the Tocumwal specimens that truly spectacular revelations were made. Then it was proved beyond doubt that in the mating season there may be a very definite and exceedingly violent rivalry between the males.

Thriving on a plentiful supply of frogs inhabiting the weeds of the water moat, the big Black Snakes live side by side in amity with representatives of the other well known venomous species, Tiger Snakes, Browns and Copperheads. At night they curled up beneath broad sheets of bark.

On the morning of October 12, 1936, an air of excitement and irritability was noticeable for the first time among the Black Snakes. No sooner did one specimen come into accidental contact with another than both reptiles would shoot swiftly away to cover. In fact, it seemed almost as if an electric tension existed among them. As the day grew warmer two of the largest snakes approached one another and moved along side by side, with heads arched and raised about a foot from the ground. As they moved their heads swayed slightly in a sidewise motion and their mouths gaped open.

Though for a long time this curious alignment of the two reptiles appeared to be a preliminary to mating, this was definitely not the case, for the pairing of the male and female is an entirely different and more passive proceeding. Akin to a fencing bout, the curved necks and raised heads were an "on guard" position which lasted just long enough for one of the males to gain the advantage by placing its arched head above that of its competitor. The aggressor then twisted its neck about that of its enemy and continued the twist, with furious writhing movements, until its whole body was entwined about that of the other. The latter, though at a disadvantage, retaliated in similar fashion to the best of its ability. The general effect was that of a two-strand rope. Writhing, hissing and struggling, both reptiles exerted the greatest possible constriction upon one another, and actually rolled slowly over and over. The "round," if one may so term it, lasted for perhaps a minute. Then, as if by mutual consent, they disengaged suddenly and completely, but separated only to line up again, slowly and with gasping hisses, and repeat the whole "on guard" position and bewildering, twisting motions. Many times on that first day and on subsequent days, whenever the weather was sufficiently warm for active movement, the two big snakes continued their efforts to wear one another down. Occasionally they glided slowly the whole length of the pit with mouths gaping open, hissing and gasping, before one gained the initial neck hold and precipitated the twisting "rope grip." Not



The battle is joined. The snake that won this "round" is the one with its head above that of its adversary. Combat scars of frayed and worn scales can be seen.

These Brown Snakes have fought in the hot sun until both are exhausted.

always did the same snakes fight with one another; occasionally a different male was involved. Smaller males were also observed in side conflicts and it was noteworthy that they appeared to struggle with snakes approximately their own size. However, the original large combatants persisted in their bitter feud, and it is the real giants of the tribe that appear to defend their territorial rights most strongly. The scales on both dorsal and ventral surfaces of the rivals became frayed and worn so thin that hemorrhages were visible along both bodies and a general reddish tint could be seen through the scales. So engrossed were the combatants that on several occasions, as in the later Murrumbidgee feud, they completely ignored my presence and continued to struggle even when lifted from the ground.

There is little doubt that in the wild, during the spring pairing months, the stronger male intimidates rivals and drives them away from his particular territory, and in support of this the 1950 season furnished actual proof. Emphasizing the fact that these struggles are not mere "stadium" events brought about by captive conditions, the following points may be stressed.

Among a hundred large Black Snakes captured up and down a fifty-mile stretch of the Murrumbidgee River in November, 1950, practically every male showed frayed, worn, body scales (as distinct from an old coat) – the definite result of wrestling; and it was commonplace for various individuals to battle in enclosures and even in bags after capture. Conflict occurred when the day became sufficiently warm for active movement and usually the weaker snake soon had enough and "beat it."

Also, during the two months of October and November, 1936, and in the same months of later years, while rival males fought, it was obviously the mating period and when the pairing season ended in late November, so likewise did all inclination to fight.

Again, various bushmen have reported the discovery and killing of tightly entwined Black Snakes which were rolling about and struggling in the swamps, so engrossed as to be easy victims to the usual stick or piece of fencing wire. Mistakenly but quite naturally these observers have considered their victims to be pairing. Other country people, of course, will tell you – and adhere strongly to the belief – that snakes are most savage in March, which is usually termed the mating season. They do not stop to reason that this is precisely the time when young snakes are born. I have observed Tiger Snakes and Copperheads mating in March, but such activity may or may not possess special significance.

In the snake yard feud at the Zoo (and as observed again this year in an enclosure at my home where, unlike the case in the wild, there was no escape for either of the rivals), weeks of intermittent struggling ended in one of the snakes being bested. With scales torn and bleeding, obviously totally exhausted, the vanquished one retired for several days to rest its battered body. Previous to this respite the encounters between the snakes had been more than usually bitter and there were several instances of the rivals actually biting one another savagely. However, in view of the strong resistance of Australian snakes to their own venom this was definitely a very futile proceeding and largely a measure of temper at the moment.

The general migratory route of the Harp and Hood Seals is indicated here. The path around southern Labrador and Newfoundland has been known to sealers for many years, but north of this area details are lacking. Tagging operations are at present in progress by the Fisheries Research Board of Canada. A. North and south migration is reported to occur in Hudson's Bay. B. The southward migration of Harp Seals. C. The southern migration of Hood Seals. D. Other seal herds migrate along the east coast of Greenland; some may reach Newfoundland.

In foreground, Harp Seal pups near their "bobbing hole." Beyond is a heap of seal skins, marked with the flag of the Theron, the ship making a catch here.

The sealers have gathered around a "pan" of skins, which are now ready to be dragged across the ice and stowed aboard ship. A "pan" is about 300 skins.

during this southward drift that the commercial fleet sets sail from St. John's, Newfoundland, on March 5. The Norwegian fleet arrives at the ice pack several days earlier. Newfoundland law permitted Newfoundland sealers to kill seals on March 13, at which time the young harps are two weeks old. At this time and during the following two weeks the young harps are in prime condition for hunting purposes since they possess a layer of fat from two to three inches thick which yields valuable oil – the prize of the hunt as far as the sealer is concerned.

If the sealer's venture is to be a success, he must locate the seal herd or herds on or before March 28, the approximate date of the Whitecoats' taking to the water. Success in locating the herds varies from year to year, depending in large measure upon ice and weather conditions. When ice is heavy and hard to penetrate, access to the herds is delayed and may be delayed so much that the herd, whole or in part, may escape without harm. Failure to locate the herds in this limited time results in an unsuccessful seal hunt although a less profitable voyage may be garnered from the older year classes. Generally, however, the voyage is abandoned soon after the young harps have been hunted.

About 100,000 seals are said to whelp annually in the Gulf of St. Lawrence and an unknown number on the east coast of Newfoundland, certainly several hundred thousand.

Harps and hoods proceed north again following the pupping season. It is presumed that the

Stacks of seal skins on the deck of the M.S. Theron. The carcasses of the animals have been left on the ice. It would seem that some use should be made of the enormous amount of protein food thus wasted.

We Are Attempting to Breed the Platypuses

By LEE S. CRANDALL

The Duck-billed Platypus won its fame by being an egg-laying mammal. We hope Penelope fully realizes her responsibility.

When David Fleay arrived from Australia on April 25, 1947, with our three Duck-billed Platypuses, it was indeed, to use his own words, "a famous morning." No Platypus had ever previously landed alive upon a foreign shore, with the exception of the solitary animal that lived with us for seven weeks in 1922. The safe transportation of three in a single lot was a great achievement to be recorded to the everlasting credit of David Fleay.

Happy though we were at the successful outcome of this difficult project, we knew many problems of maintenance must be solved. The only previous experience that could be drawn upon was our own and that was not too encouraging. If the best one animal could manage was 49 days, why should Cecil, Betty and Penelope be expected to do better?

But our doubts were soon dispelled by the consummate skill of David Fleay and the readiness with which Keeper John Blair absorbed David's techniques. When David and Sigrid Fleay left for Australia in August of 1947, John took over the care of the Platypuses with a confidence which has been fully justified by continued success.

During the Platypuses' first winter with us, in 1947-1948, we developed an acute shortage of the earthworms that were the main items of the Duck-bill diet, and Betty, one of the two females, seemed unable to accommodate herself to the emergency rations that the others accepted. As a result, she lost weight noticeably. We think that because of her loss of weight, she became too thin for the "squeegees" inside her burrow tunnels to press the water from her fur when she came in from the swimming tank. Going to bed damp, in September of 1948 she caught a cold, and finally succumbed to pneumonia.

Cecil and Penelope, however, showed no ill effects of the temporarily restricted diet and continued urbanely to gain weight and condition.

For four consecutive summers our Platypuses

have been viewed by the public in their exhibition Platypusary in the center of the Zoological Park. Our records show that 367,939 visitors filed past to watch them. In the intervening winters the animals were kept in the old travelling Platypusary in which David Fleay brought them from Australia; the wooden boxes with their arrangements of tunnels had been set up in a wire enclosure in the basement of the Main Bird House. This arrangement has obviously suited the Platypuses well, for each spring they have come out of doors in sleek and shining condition.

Four summers of continuous exhibition had so far exceeded our expectations that in the autumn of 1950 an even more ambitious plan took form. Could we breed the Platypus? David Fleay had done it in Australia in 1943-1944. True, this was accomplished in a climate that was natural to the animals, and they were nourished by a variety of natural food. Even then, the accomplishment was unique as far as the Platypus is concerned. There is no other record of success. Also there is the fact that in the Melbourne region, the home of Cecil and Penelope, the Platypus breeds in September and October – the spring months there. We have no more than a vague hope that the breeding urge will overtake them here earlier in the season. And they must return to the warmth of the Bird House basement by the end of October.

All winter we discussed the pros and cons but in the meantime the Platypuses had taken more positive steps. The year before, Penelope had opened a crevice in her sleeping box and was able to get out. By spreading white sand on all flat surfaces, Keeper Blair was able to determine that she was making surprisingly wide and active nightly travels, all over the screened enclosure.

Before the animals came indoors last fall, John Blair made a small but formal door in the sleeping box so that Penelope could enjoy her nightly wanderings in more dignified fashion.

This she did regularly each night until midwinter. And then, one morning, Blair found that Cecil and Penelope had reversed their sleeping

The nest and eggs of a Duck-billed Platypus. These were photographed in the Healesville Sanctuary in 1945. The nesting material is mostly eucalyptus leaves; the eggs have a thin, leathery shell.

David Fleay Photo

David Fleay Photo

If we do get a baby Platypus, it will look like this— the first Platypus ever born in captivity. This is Corrie, hatched in the Healesville Sanctuary in Australia in 1943-1944, at the age of eight and a half weeks.

arrangements – Penelope was asleep in Cecil's burrow, Cecil in Penelope's. The male, too, had found a way to get out at night. In fact, it is probable that they had been enjoying quite a number of clandestine meetings at night without even their keeper suspecting it, until they happened to go into the wrong burrows at daybreak.

This discovery ended our misgivings. David Fleay had warned us that the poisonous spur carried on each hind foot of the male Platypus might be used against a strange animal, with fatal results. Such a disaster, indeed, had occurred in David's own experience.

This last obstacle having been removed, our course was plain. We might go on exhibiting our Platypuses for the length of their lives, which we hope will be long. But always we should have but feeble answer to the frequent question, "Will they breed in captivity?" So this year, when Cecil and Penelope returned to their summer quarters in the out-of-doors Platypusary in mid-May, it was under new conditions. No loud speaker announced the hour from 3 to 4 P.M. as the time when the Platypuses might be seen. No crowds waited in line for a brief look at our fabulous little egg-laying mammals. For the Platypusary is closed to the public for the first season since 1947 in the hope that Penelope may, in truth, lay eggs.

When the exhibition Platypusary was built, in accordance with plans furnished by David Fleay in advance of his arrival, an earth bank with concrete sides and wire netting bottom for drainage was included. This bank is connected with the wooden burrows at Penelope's end of the structure. We built it because David included it in his plans and not at all because we had hopes of our own – our ambitions then were concerned with keeping the Platypuses for longer than forty-nine days. Early this spring the earth bank's solid cover was removed, the contents checked and well watered. It has been furnished with a tight but removable screen top, with a tarpaulin to avoid flooding.

The wooden partition in the 20-foot swimming pool, that for four years has kept Cecil and Penelope apart, has been removed. Nature is now free to take its course. Whether or not we breed the Platypus, we can say, at least, that we tried.

News from the Conservation Foundation

"Yours Is the Land" Receives Award

The Conservation Foundation's impact film, "Yours Is the Land," was one of ten 16 mm. informational films to be given an Award of Merit at the Annual Educational Film Festival conducted by the Communications Materials Center of the Columbia University Press. These awards, made yearly under the auspices of the educational magazine *Scholastic Teacher,* are significant since they represent the judgment of a board of educators who this year reviewed some 355 films before choosing the winners.

The awards were presented by Dr. John W. Studebaker, Chairman of the Editorial Board of *Scholastic Teacher,* at a dinner meeting on the evening of May 2, at the Faculty Club of Columbia University, John C. Gibbs accepting for the Foundation. In the afternoon six of the winning films were shown to the group of educators and producers attending the meetings, and the remaining four, including "Yours Is the Land," were exhibited following the dinner.

This highly desirable recognition comes close on the heels of a most complimentary order for forty-seven prints recently received from the Firestone Tire & Rubber Company, an order which the film department hopes is a harbinger of the opportunity to sell conservation films to industrial organizations. Firestone, we understand, is one of a number of large companies now building up film libraries for their dealers' use.

On May 16, Mr. Gibbs conferred in Washington with the Ambassador and other representatives of the Brazilian Government on the matter of the Portuguese translations of the sound tracks of all the Foundation's film production. Spanish recordings for all thirteen of the Foundation's films are also in production.

In addition to final film "shooting" and editing for the Living Water Series, the department has been busily working on several 3-minute silent movies adapted from the footage of the longer films. Several preliminary experiments were shown at the April meeting of the Foundation's Trustees. We have been given to understand that a broad market exists for such short documentary subjects designed for schoolroom use.

Snider Attends Florida Water Meeting

On May 1-8 Robert G. Snider attended the Miami meetings of the American Waterworks Association. The research division is pursuing plans for further study of industry's consumption of water per unit of production, a continuation of the work done last year in collaboration with the National Association of Manufacturers.

Consent of the Forest Service has been obtained for a six-to-twelve-months' leave of absence for a man qualified to conduct our proposed survey of ground cover in relation to water availability. The Forest Service and other governmental agencies have agreed to provide the Foundation with access to hitherto unpublished materials dealing with this subject. Mr. Snider reports that preparations are still being made for the study of the economic feasibility of converting salt water into fresh.

Newcomen Society Publishes Osborn Speech

The Newcomen Society in North America is reproducing in book form a recent address made by Fairfield Osborn before the Society in Cincinnati. The title of the address is "60,000 More Every 24 Hours." This publication will have the national circulation which all Newcomen Society printings enjoy and will be printed in their usual highly attractive manner.

Local Boy Scout Program Moves Along

Following preliminary meetings with various officials of the Boy Scouts of America, a luncheon was held at the Zoological Park on April 5 for the purpose of discussing a program of interest to a number of organizations — the Zoological Society, the Conservation Foundation and the Boy Scouts of the Greater New York area. The meeting discussed the feasibility of making available certain undeveloped areas in the Park for use as training grounds in conservation for leaders of Boy Scouts and similar groups.

There are some 60,000 boys in the Scout troops of the Greater New York area, very few of whom take any active part in the overall Scout conservation program for lack of land on which to work. The proposal is to put our idle Park acreage to use by letting the Scouts and other youth groups develop conservation projects thereon which can be the basis for the training of leaders heading up conservation work on the many large Scout campsites in this area. Possibilities for a Scout-built nature trail were discussed, and some attention was also given to the subject of the many ways in which the Society could help the Scouts in the development of their local nature programs. It was generally agreed that a closer relation between the involved organizations is highly desirable, and that a greater interest in the Park on the part of the Scouts might even have a bearing on the solution of juvenile delinquency problems within the Park area.

Attending the meeting were Messrs. Brunton and Nichols of the New York Council, B.S.A., Ted Pettit of their National Office, A. W. Smith of the Conservation Foundation, William Latham of the Park Department (also active in Scout work), Otto Koenig of the Federal Forest Service (likewise a Scoutmaster), and Tee-Van and Carlisle of the Zoological Society.

A sub-committee was proposed to develop a program for submission both to the Zoological Society and to the local Scouts. By the time this magazine is printed it is hoped that this program will have been completed.

This may well be a pilot project that will give point to the Scout conservation effort in metropolitan centers all over the country.

You Must Know Some

AT THE RISK of boring you again we repeat that you *must* know people who ought to belong to the Zoological Society.

Six years ago, when we had only a few hundred members, almost everybody turned to and helped us raise our membership five-fold. This meant a lot to every member — more fascinating parties, better publications, many new interesting and valuable services.

Please help us again.

If you don't want to ask your friends to join, then send us their names. We are absolutely ruthless about writing anybody!

Send them to:
MEMBERSHIP CHAIRMAN
New York Zoological Society,
30 East 40th Street,
New York 16, New York

BEHIND THE SCENES

NEWS AND NOTES OF THE ZOOLOGICAL PARK, THE AQUARIUM AND THE DEPARTMENT OF TROPICAL RESEARCH

Zoological Park Miscellany

The six two-years-old Lions posing so proudly on the cover of this issue of ANIMAL KINGDOM were liberated on Lion Island for the first time on April 13. All six were born in the Dallas Zoo in the spring of 1949. They replace three Lions which lived on the island since 1941. The "old-timers," about 15 years old, are now inmates of the Philadelphia Zoo's new Carnivora House. . . . Removal of the iron bars on the east side of the Elephant House yards was begun in April, and a new moated and barless enclosure for our two Asiatic and large African Elephants should be completed by Spring Garden Party time, June 14. . . . John Quaranta, who held a Summer Animal Behavior Research Fellowship in the Zoological Park in 1949, will continue his work this summer on a specific problem of color perception in the Galapagos Tortoise.

North Atlantic Sealing

(*Continued from Page 76*)

very desirable, especially in view of the fact that interest in the industry is mounting, both in Newfoundland and other maritime countries, in particular Canada and Norway. Aerial surveys during March and April seem quite feasible, for seal herds may be found within one hour's flying distance from Gander Airport during the breeding season. Seals in the Gulf of St. Lawrence, where it is said at least 100,000 seals pup annually, can also be located from Gander, Harmon Field, and Prince Edward Island Airports.

The possibility of obtaining valuable information from the commercial fleet is not at all remote, either by observers stationed on various ships or by the collection of data through prepared questionnaires distributed among officers of the crew. Such information would of course be limited to the period of the hunting season, i.e., March and April.

On the basis of complete population estimates supplemented by increased knowledge of the life history, habits and behavior of the seal, it seems that the fishery can be regulated at least as far as the numbers taken annually is concerned.

Such a survey, it appears, ought to be international in character, involving at least those countries which have an interest in the industry as well as in the preservation of the species.

* * *

The Children's Zoo had 7,439 visitors on Sunday, May 6, matching exactly the previous record of 7,439 on Sunday, April 16, 1950.

Dr. Gordon Found "Giant" Swordtails

Dr. Myron Gordon, the Aquarium's Geneticist, returned from Honduras on April 13, having completed a preliminary survey of the fishes of the Atlantic drainage of that country with special reference to Platyfishes and Swordtails. Dr. Gordon determined that Platyfishes are definitely missing from Honduran streams and lakes, but that Swordtails are abundant. He discovered some giant individuals, six inches over all, much larger than Swordtails usually grow, and a few of these, together with more normally-sized fish, were shipped back alive to the Genetics Laboratory. While in Honduras, Dr. Gordon was the guest of the United Fruit Company which extended many of its facilities to him, making it possible to collect in the most out of the way places.

There Is a Difference in the Taste of Earthworms — to Platypuses

Since late 1946 the Aquarium has been operating a Worm Farm in the basement of the Lion House, breeding and maintaining earthworms to feed the Duck-billed Platypuses. One of the first discoveries we made about these mammals concerned their incredibly finicky appetites. Not only did they insist upon active, live worms, but they definitely preferred certain kinds to others, and some kinds turned out to be quite unacceptable. For example, they would not eat Brandlings, or Manure Worms, save on rare occasions, and then only a very few at a time. This was unfortunate, because the Brandling is the easiest species to keep in captivity and the most amenable to mass culturing. It made no difference that our Brandlings were raised in the sweetest of topsoil; the Platypuses still refused them.

Fortunately the several types of so-called Garden Worms proved acceptable, and so did the larger Night Crawlers. Garden Worms lived well and reproduced fairly regularly in our pits, forming our principal stock and the main food of the Platypuses for the first few months of their life in the Zoological Park. But sometimes Garden Worms, or even Night Crawlers, failed to titillate the Platypuses' palates; it was not until Tankmen Callahan and Malcolm, who were taking care of the Worm Farm under the supervision of Curator Coates, turned up a new kind of earthworm that the problem was settled — to the complete satisfaction of the Platypuses at any rate.

This new worm was found in the Park among decaying leaves, rather than in the ground. It could readily be distinguished by the glistening iridescence of its cuticle and by the violent way in which it whipped its body about — more like a snake than a worm — when handled. Callahan and Malcolm dubbed their new catch "Leafworms" or "Fighter Worms," but their exact identification had to await the work of a specialist in earthworm taxonomy. In the meantime, however, large numbers of these worms were collected and fed to the Platypuses, for they seemed to be the Platypus food *par excellence*. Although the Platypuses consumed prodigious quantities, they never seemed to tire of Leafworms, which became the staple of their diet.

When Dr. G. E. Gates of Colby College, expert in the biology of earthworms, examined our Leafworms, he found that they consisted of two species of *Pheretima,* an oriental genus which has been accidentally introduced into this country. Our Leafworms most likely originated in Japan or on the nearby Asiatic mainland. Then from Westchester County we received a small collection of Leafworms that Dr. Gates identified as another species of *Pheretima* not previously known to exist in the United States. The operation of the Worm Farm has thus inadvertently contributed to scientific knowledge about earthworms and has added three species to the score or so of earthworms known to exist in New York. In addition, among a shipment of worms made to us from Florida, Dr. Gates discovered a fourth species of *Pheretima* which is new to to the fauna of the United States. — J.W.A.

"Saturday at the Zoo" Shares Peabody Award for TV

The Zoological Park's television show, "Saturday at the Zoo," which was offered over the American Broadcasting Company's network for 26 weeks in 1950, shared the George Foster Peabody Award in the Children's Television Program category. Announcement of the award was made on April 26; it was split between "Saturday at the Zoo" and "Zoo Parade," the television program of the Lincoln Park Zoo in Chicago.

The award was made in these terms: "An award for a consistently informative and remarkably entertaining program, a television visit to the Bronx Zoo, New York City, for the opportunity it has given children (and their parents) to become acquainted with the personalities and characteristics of the zoo's large, varied and international population. The program is also recognized for its excellent background material and the astute comments which are a part of the program."

* * *

From a recent shipment of Far Eastern fishes the Aquarium has purchased some Mudspringers, *Periophthalmus,* the peculiar fish that hop about on land like frogs, together with Telescope and Lion-head Goldfish. The Lion-heads are the first of this variety that we have seen in this country in more than ten years.

PUBLICATIONS OF INTEREST

LET THEM LIVE. By Dorothy P. Lathrop. 80 pp., illus. The Macmillan Co., New York, 1951. $2.00.

This book is probably intended for children, but it is to be hoped that adults, reading it to the young, will take its lessons to heart. Those lessons are that animals have a natural right to share this earth with man, that man needs them, and that the earth would be a poorer place in more ways than one if man's present stupid destructiveness of wildlife is unchecked. It is the "balance of nature" theme, simply and logically presented. The author-artist presents the case for a large number of familiar animals and concludes: "We must let them live or we shall be alone in a silent world, and lonely for the singing of birds and the flash of their wings, for the chirping of insects and the swift running of wild feet."

SNOWY: The Story of a Polar Bear Cub. By Jan Vlasak and Josef Seget. 87 pp., 70 photographs. Henry Schuman, New York, 1951. $2.50.

Comparatively few persons ever have been, or ever will be, faced with the problem of rearing a Polar Bear cub from birth to maturity. But if the company is select, the literature of its specialty is even more so: this book is it. "Snowy" concerns the successful attempt of Mrs. Jan Vlasak, wife of the Superintendent-Veterinarian of the Prague Zoo, to rear a cub produced by Nora, a female in the Zoo. Nora was a regular producer of cubs, but never managed to rear any of them herself; Mr. and Mrs. Vlasak took charge of a pair of cubs born in December, 1942, during the German occupation (when supplies and facilities must have been extremely difficult to obtain) and reared one of them. This is a detailed but popular account, charmingly illustrated by photographs of "Snowy" at various ages, of the Vlasak's adventures and observations. The book grew out of a film which was shown before the Zoological Society of London in 1947, and has been edited by Dr. Maurice Burton of the British Museum (Natural History).

INSECTS IN YOUR LIFE. By C. H. Curran. Photographs and drawings. Sheridan House, New York, 1951. $3.50.

"Insects in Your Life" starts realistically. Dr. Curran says: "No one can deny that most people do not like insects and I shall make no attempt to convert them to insect lovers." With that premise, he goes on to point out briefly that whether we like them or not, insects are vitally important to our economy and actually essential for the existence of man. Then, easily and anecdotally, he goes on to talk about flies, the miscellany of insects about a house, clothes moths, termites, the woolly bear caterpillar, butterflies, ticks and a host of other winged or crawling creatures, with an interesting terminal chapter on DDT. It is all fascinating stuff, authoritatively told by the Curator of Insects and Spiders at the American Museum of Natural History.

THE GREAT WHALES. By Herbert S. Zim. 64 pp.; illus. by James Gordon Irving. William Morrow & Co., New York, 1951. $2.00.

Here is about all the information about Whales that the average youngster is likely to require, succinctly told by Dr. Zim and arrestingly illustrated by Mr. Irving. The biggest creatures that have ever lived (not excluding the prehistoric monsters) are sure-fire subjects for a child's imagination – and adults, too, can find nuggets of information. As, for instance, that whales shed greasy tears. This book presents good natural history in sensible, direct terms, without writing down.

STATE BIRDS AND FLOWERS. By Olive L. Earle. 64 pp., many illlus. William Morrow & Co., New York, 1951. $2.00.

Except in the *World Almanac,* it might be a little difficult for most of us to find what bird and flower have been chosen to represent the various states. Even then, other reference books would have to be consulted for even a minimum of description and natural history. Miss Earle has gathered all the information about the "official" birds and flowers of the 48 states (as well as Alaska, the District of Columbia and Hawaii) and here they are, pleasantly set forth in text and drawings.

New Members of the New York Zoological Society

(Between March 1 and April 30)

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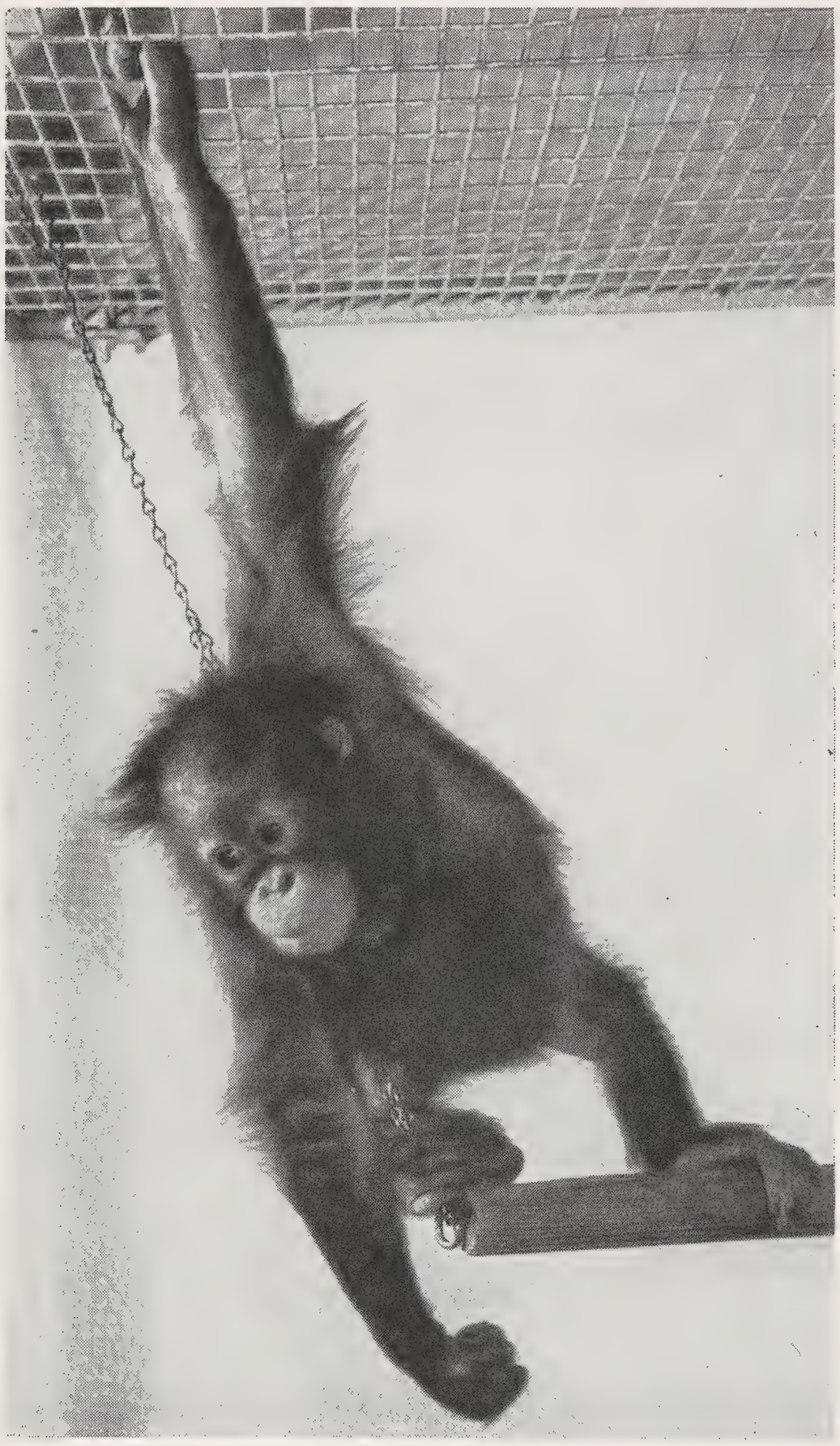

ANDY HAS NO SENSE OF SHAME

—at least we have never had any reason to think so.

And he likes crowds, too. That's why we feel sure that if he could talk he would urge you to help us get some new members for the Zoological Society. "The more the merrier," he'd say.

But Andy can't talk, and the best we can do is use his picture to try to attract your attention to our need for more members.

Please help us by sending the names of people who should join to:

MEMBERSHIP CHAIRMAN,
New York Zoological Society,
30 East 40th Street,
New York 16, N. Y.

NEW YORK ZOOLOGICAL SOCIETY

. LIV · No. 4 JULY-AUGUST, 1951

ANIMAL KINGDOM

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THE MAGAZINE OF THE NEW YORK ZOOLOGICAL SOCIETY

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ANIMAL KINGDOM

Bulletin of the New York Zoological Society

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Travel

ANYONE WILL AGREE that it is a good thing to travel around and "see the world." Fortunately, our Society is in a position to permit fairly regular trips by its staff members to distant places in order to keep in contact with what is going on in other organizations here or even abroad. For the members of our staff who are working on scientific problems, trips afield or to technical conferences in the areas of their interests are invaluable experiences.

In the present year, for example, several trips of this nature are taking place. In early Spring a member of our organization went to the Republic of Honduras to obtain new stocks of sword-tail fishes for work in genetic studies of pigment cell growth. Our General Curator went to Europe last month to participate in the annual meeting, in Amsterdam, of the International Union of Directors of Zoological Gardens. Another staff member will go to Europe in August to attend the Ninth International Entomological Congress in Amsterdam. Still another, representing both the Society and the Conservation Foundation, will go to Alaska in early September to attend a conference on Alaskan resources in Mt. McKinley National Park. All the while field research goes on apace both at the Tropical Research Station in Trinidad and at the Biological Station at Jackson Hole, Wyoming. All such trips and activities are the best kind of antidotes to inertia and lack of progress.

Fairfield Osborn

Dr. Beebe writes from "Simla," the Department of Tropical Research laboratory in Trinidad, that "The present paper embodies some of the observations and experiments concerning Simla mantids. It will be followed in Zoologica *by a technical presentation."*

The Case of the Wise and Foolish Mantids

By WILLIAM BEEBE & JOCELYN CRANE

Orthoptera, that great order of insects, consists of six dominant family groups — cockroaches, locusts, long-horned grasshoppers, crickets, stick insects and mantids. The first, as many a housekeeper will tell you, are omnivorous, feeding on almost anything useful to man. The next four are plant eaters, as farmers well know when swarms of locusts appear. Only the mantids are meat eaters. So far this classification is deadly dull and stimulates only the retort, "So what?"

Considered psychologically, these beings become alive with interest. Try and make friends, if you have such an urge, with any of the first five and the results are nil. The sole object of a roach when confronted with a human being is to satisfy its desire for thigmotactism — in plain language, to feel itself in touch with as much of its environment as possible. Pragmatically, its idea of Nirvana is to flee into a crack where at least three sides of itself are protected. No grasshopper or cricket appreciates friendly advances. They leap or fly as far as six legs and four wings will take them.

Stick insects are in a different class. They neither welcome nor rebuff any fraternization. Their whole desire in life is to be mistaken for something botanical and dead. Their reactions to any approaching creature, beast, bird or human, is to seem to be, to simulate, a twig of twigs.

There remain mantids. Here we have the only meat eaters of their order,* and the mental difference from fellow Orthoptera is the distinction between a dull, stolid sheep and the alert dog which controls it. Hosts of articles have been written about mantids, but this one will be unique in that we shall not say why they are called *praying* mantids. With reluctance we will also refrain from a pun on the equally apt adjective *preying*.

In connection with the curious adaptation of the fore limbs of the mantids for reaching out and grasping their prey, there occurs a remarkable problem in evolution. We can understand, dimly, how in the case of mantids the insignificant basal joint of the foreleg could become enormously elongated, and how the reach of the grasping instrument is made more efficient by an equally exaggerated extension of the neck-like prothorax. Such a combination of characters could conceivably occur once (like the proverbial possibility of a monkey adventitiously succeeding in writing out a sonnet of Shakespeare, given a sufficient number of chance hammerings on a typewriter—just under astronomical figures).

* I am perfectly aware that there is a carnivorous grasshopper (see *High Jungle,* page 96) but he is a displaced person in the general scheme; *exceptio probat regulum,* and that's that.

"Liliana" was a Dried Leaf Mantid, drab and inconspicuous when hanging from a dead twig. But startled, she was suddenly a menacing gypsy dancer.

The duplication of such a phenomenon is almost incredible. Yet in the realm of insects we find two other unrelated cases — the mantispids among the Neuroptera, and thread-legged bugs of the Hemiptera — where identical changes have evolved, both in structure and function. As far as grasping forelegs are concerned, these creatures are mantids; whereas actually they belong to wholly different orders of insects. Such things are more than coincidence, more than mimicry, and leave us with a child-like inability to do more than wonder at our own ignorance.

After futile encounters with roaches and stick insects we meet a mantid. We arm ourself with an appetizing spider or small moth and gently proffer it. At this point we are probably somewhat embarrassed because of the intense scrutiny with which the mantid surveys us. Unlike most insects she has a mobile neck, and the bulging head and eyes turn full in our direction as if trying to discern our intentions. Although we must appear a veritable giant, and a malformed one by mantid standards, yet the chances are she will accept our offering in her toothed arms and devour it.

We labor all this to make apparent the unique psychology of these captivating insects. They accept confinement in a terrarium without active opposition, and clamber about our hands, perform their facial toilet unabashed before us and behave as though being ogled and handled by monstrous human beings were not new experiences. They are of the select body of wild creatures which appear to be waiting for man to appear, to tame and domesticate them. Others are mallard ducks, red junglefowl and rock doves.

The order to which mantids belong, Orthoptera, is low in the evolutionary ordinal scale. One characteristic is a relative simplicity of development. The complexity of intervening grub, maggot, caterpillar or other larva does not enter into their growth. Once a mantid, always a mantid, and from the many-shaped egg-case the infant emerges, if not full-sized, like the crop of Cadmus' dragon-teeth, yet with all mantine ear-marks in miniature. When first he looks upon the world the mantid may stretch only four to the inch overall, but his little fists already have rows of minute spines, and are folded tightly to his chest, at trigger-poise, ready for use. His first meal is a precarious one. We provide the smallest of innocuous drosophila banana flies, yet the very first clutch often holds, although a rough-and-tumble mêlée may ensue — as if a very small boy should seize a full-grown swan.

From the very egg comes the instinct to be a leaf or twig; to sway (even when there is no wind), to waggle one's body as if in a sudden breeze, to turn one's head and examine the gigantic approaching finger, even to strike defensively at it, as a mouse might smite an elephant. Molt by molt the mantid increases in stature, gradually assuming the structure of its

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particular species, and cloaking itself in definitive pattern and pigment.

We characterize mantids as ravenous as we watch them stalk, or lie in wait for the approach of their victims. Their appetite is more than healthy for they often devour every portion — body, head, legs and wings. We characterize them then as carnivores and predators, and because of their courage and rapacity they have been likened to tigers among beasts of prey. With this we end our preamble and come to the gist of these notes. It concerns the biter bit, the pursuer halted, the fierce assaillant become the threatened, the aggressor put in fear for her very life.

Although the tables are completely turned, yet the mantid maintains its psychological balance, and meets a life's crisis with alert expediency.

The discovery of unexpected resources in our mantids held some of the surprise we felt when our lumbering Hercules Beetles turned out to be expert fighters. We thought we knew Liliana, the Dried Leaf Mantid, intimately. We had found her often, across the breadth of South America. Generally she was hanging from a dead twig, a shrivelled leaf among the others, the frills and veins on her brown wings helping her play the part as she trembled in the breeze. Often we brought her to the laboratory, and delighted in her instant, ridiculous tameness. We fed her endlessly on small insects, watched her lay a stringbean of an eggcase and saw her lively progeny emerge. We were never bored while she made half hour toilets, cleaning every spine and polishing her eyes. We even put her in the movies. But we did not know Liliana.

Then, one day at Simla, we hurriedly started to pick her up instead of allowing her as usual to climb upon our hand. At the touch of fingers she changed like Cinderella under the wand. The drab little brown leaf became a gypsy dancer. Up came her head and all the forepart of her body; her first legs spread wide and graceful as a pair of slender arms; two hidden wings unfurled, gay with black and yellow. Then, as she balanced on her toes, came the climax. The end of her body flashed up and sidewards, free of the wings and flaunting shiny bands of pink and black. Now she sidled back and forth in front of us. swaying as she went, seesawing her

This "foolish" mantid (Acontista sp.) sat on a limb with folded wings while a lizard crept forward, and did not display.

It was "fatal foolishnes on the part of the mant for the lizard made a su den snap—and that lit drama ended abrupt

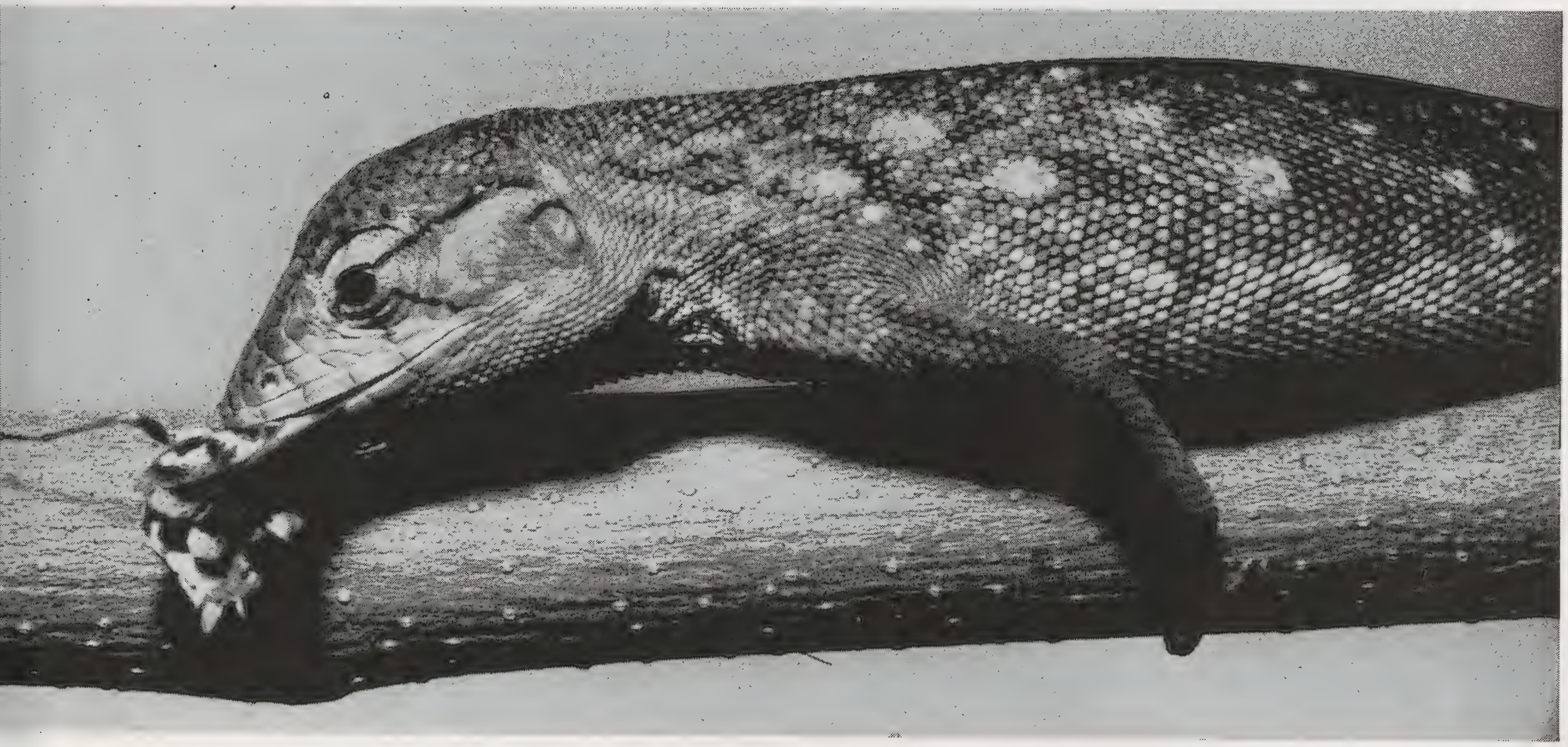
forelegs, flicking her body from side to side, quivering her elegant wings, and in general appearing as little like her retiring usual self as possible. She kept it up for three minutes, then slowly folded her skirts and became a shrivelled leaf again, hanging upside down from her customary twig.

In days to come, we tested her repeatedly with gently pinching fingers, a teasing paint brush, and, as a natural enemy, with a small green lizard who was a laboratory pet. Her first response was always to keep on playing the part of a leaf. If that seemed inadequate she played possum, dropping in a limp heap from her perch. But if she were suddenly surprised and cornered, or perhaps felt herself to be in the midst of some dire emergency, then came the flash of wings,

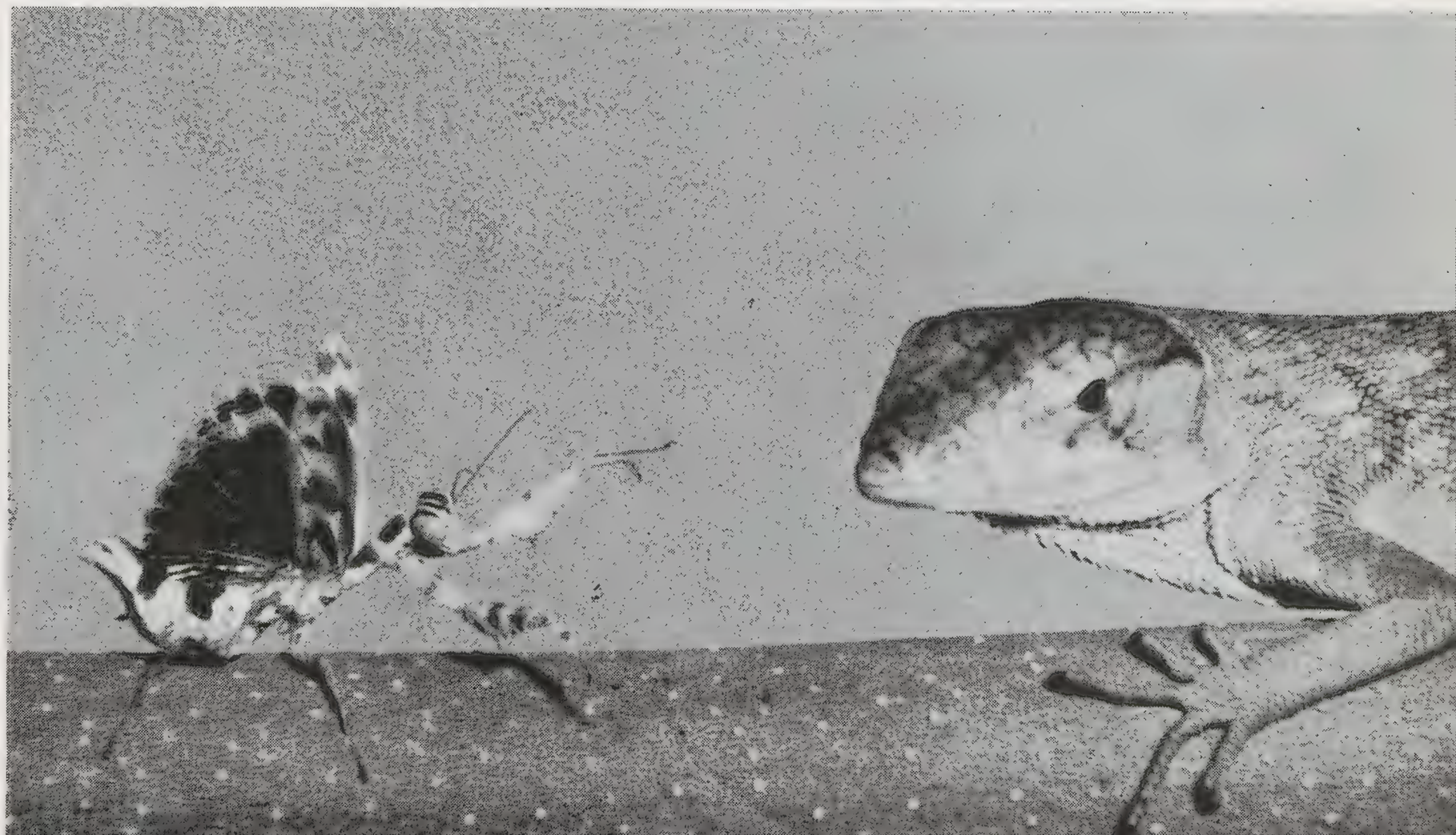
the bands of pink and black, the prancing and swaying of full display.

After that we tried all our other kinds of mantids which lived close around the house. These included many contrasts. There was a little brown nonentity, scarcely an inch in length, that melted neatly into any mass of dried vegetation, yet did not specially mimic any part of it. There were others which, like Liliana, were masqueraders, appearing as thrusting green buds, patches of lichen, and as twigs so perfect we could scarcely see them even when we knew exactly where to look. Finally, there were great green creatures, which merged vaguely into a leafy bush although they measured a good five inches in length.

Most of them, when bothered, simply continued imitating leaves, lichens, sticks or general background until the last possible minute, when



On the other hand, another mantid of the same species did not wait to be gobbled up. It went into a "ferocious" display, the lizard hesitated, the mantid had time to drop to the ground.



they dropped or flew to safety. But a few, when hard-pressed, showed a versatility similar to Liliana's, flashing a pair of colored wings, swinging a shining abdomen into view, posturing and sidling with front legs spread wide.

We wondered how much good all this did in a real-life crisis. Years ago, it seemed to Dr. Hugh Cott and a few other excellent observers, who worked in other parts of the world, that similar

displays must really tend to save some mantids from hungry enemies. So far, our own tests with a live enemy had been dubious. But we realized that this perhaps was due to the personality of our friend Liz, the tame green lizard mentioned above. He was a somnolent, phlegmatic creature, forebearing as an ancient pony among a crowd of children. He climbed about our fingers with dignity, sat motionless for minutes when placed before a non-displaying mantid testee, and often appeared to sleep peacefully as occasional flustered insects crawled over him, on their way to the nearest exit. So far he had, with what we liked to construe as scientific forbearance in the presence of rare entomological specimens, confined his appetite to suitable meal hours, when he stuffed himself enthusiastically with his lawful ration of moths and katydids. On the rare occasions when a mantid displayed, he simply blinked a bit, perhaps opened his mouth once or twice in an engaging parody of a yawn, and moved off, as the mantis sidled around the twig, became a leaf once more and fluttered to the ground. It left a question in our minds. Did the

ABOVE—Chiri-brandy, the laboratory's monkey, g
a set-back when Stagmatoptera displays and stri

RIGHT—Rearing up before going into display, St
matoptera is poised, menacing, ready for an att

display really do any good? Was our disinterested lizard, or any of his kind in the forest, affected in any way?

All that was last year. The day we left for the north we gave Liz his freedom, placing him on a mahogany trunk and watching him climb methodically upwards and vanish in a clump of orchids. On cold December days in our zoo laboratory we sentimentally imagined him snoozing through the tropical afternoon, his nose

pressed, Ferdinand-fashion, against a fragrant blossom as he steadily ignored an improbable succession of nervous Lilianas.

This year, the first lizard brought into Simla laboratory was another Liz. He was caught on the nearest flamboyant, and although we looked in vain for a sign of recognition, it was quite possibly our old friend. Confidently we introduced him to a mantid. She was little and green, but, we knew, she kept hidden a gaudy pair of yellow-bordered scarlet wings. Today, although obviously aware of Liz, she did not show the wings, but sat in front of him and swayed a mere three inches from his nose. Then something happened. Liz cocked his head, his slinky body moved imperceptibly forward, there was an audible snap — and all that was left of the mantid was a whiskery fringe of green legs, projecting from the lizard's mouth.

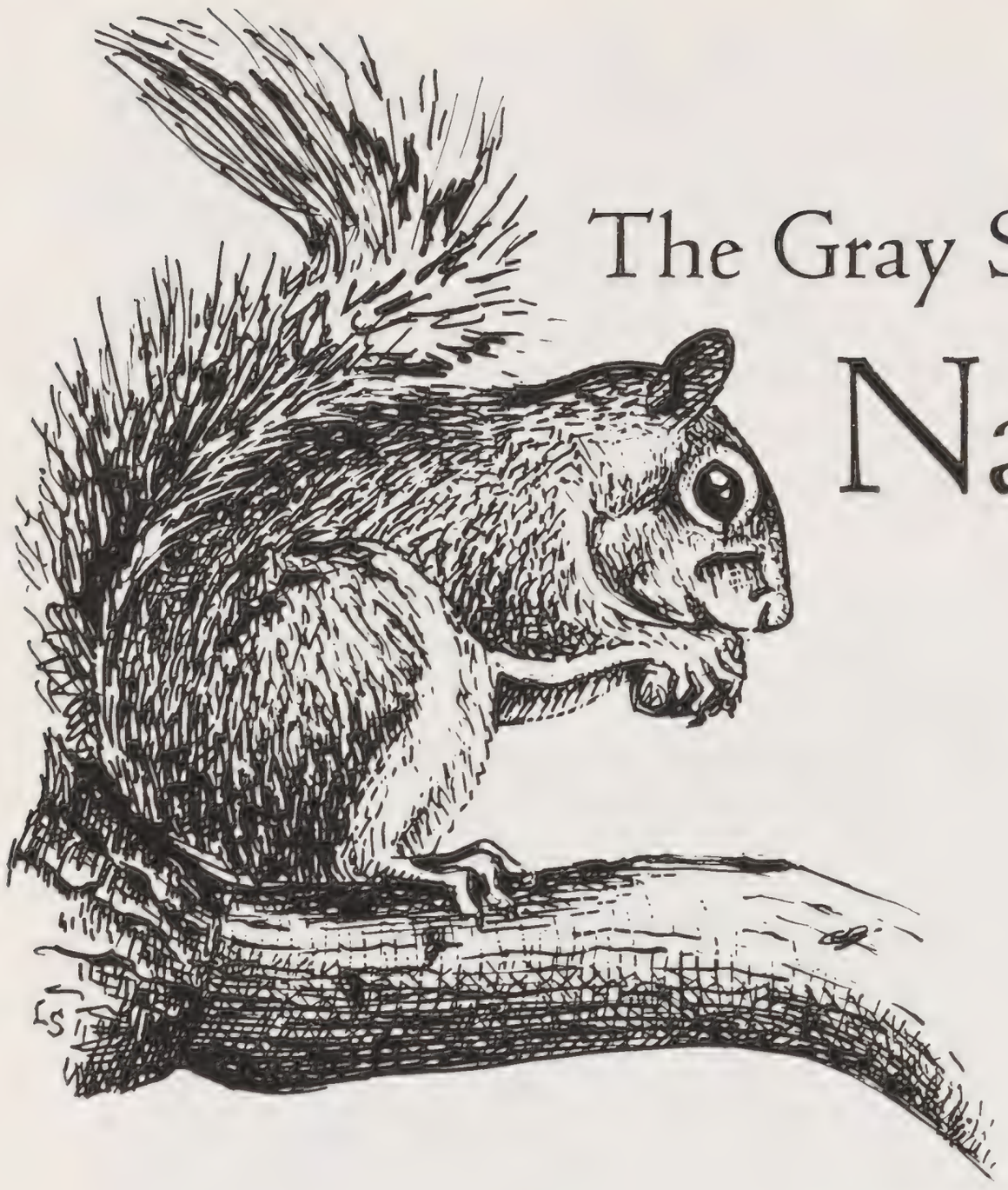
That night we deprived Liz of his customary supper, not in punishment, but so that he would have a sharp appetite for the next day's tests. Again we placed him in front of a little green mantid. This time the mantid displayed promptly — and Liz looked alert, but failed to snap. The mantid sidled away around the twig and dropped safely to the ground. A second mantid displayed, and again escaped. But the third insect merely sat before the lizard, crouched low and quivering. And Liz promptly gobbled her up.

Other days, with other species, we tried the tests, and the results were similar. Here was pretty good evidence that display was useful to a mantid in a jam. It was all bluff; these little fellows could not even scratch the nose of a well-scaled lizard. But it gave them the instant's delay they needed to escape.

Our latest mantid adventures were with a big green *Stagmatoptera*. In these the art of display and self defense reach their height. At almost any provocation, a male in good health will rear up, raise his filmy wings, swish his shiny yellow abdomen to one side, and show the black spots inside his forelegs. If further bothered, say by teasing human fingers, these legs are folded, pulled in close like a boxer's fists, ready for the strike. Then, with lightning swiftness they are thrust outward with a stinging rake of spiny claws, and as quickly drawn in again. We naturally wanted very much to know whether this manoeuver, so courageous to our human eyes, ever helped him to escape a natural enemy.

We placed Chiri-brandy, our small monkey, on a tree in the garden, face to face with a scrappy *Stagmatoptera*. Chiri looked enormous in comparison. Ready, as always, for an extra snack, he reached a tentative paw toward the swaying green creature before him. The mantid at once displayed. The monkey paused, then reached out once more. Instantly the mantid struck. The monkey drew back, nearly lost his balance, and, with a startled yelp, turned tail and fled.

And the mantid? First he washed his face. Then he accepted a small grasshopper and ate it to the last crumb. And then, with grace and beauty, he spread his filmy wings and sailed out over the garden battlements, to the high green forest just beyond, to freedom.



The Gray Squirrel — Nature's Johnny Appleseed

By ROBERT M. McCLUNG

At a conservative estimate there must be 200 to 300 Gray Squirrels living today in the New York Zoological Park's 252 acres. I have counted 19 in the five-minute walk between our Fordham Entrance and the Administration Building.

There are good reasons for their presence here in such numbers. Plentiful groves of oak and other nut trees, protection from many of their enemies and all the food they can eat, make the life of a Bronx Zoo squirrel the life of Riley.

Except for the ill-famed rat, and possibly the mouse, *Sciurus carolinensis* is certainly one of the commonest and (one would think) most familiar wild mammals in the New York area. Consequently, it always surprises the Zoo staff to hear an occasional visitor refer to a scampering Gray as a "rat."

Plentiful as they are at liberty, we have no Gray Squirrels in our exhibition cages and they do not appear on our annual census of specimens in the collection. Adult Grays do not take kindly to captivity; otherwise, it probably would be a good educational service to exhibit a pair, all properly and fully labelled, for there is much of very real interest in their natural history.

The Gray Squirrel is a rodent — one of that great Order of gnawing animals which have a single pair of chisel-like incisor teeth in each jaw, and no canines — an Order which includes the Woodchuck, Beaver, Gopher, Rat, Mouse, Porcupine and many other familiar mammals.

To the early white settler the Gray Squirrel was undoubtedly one of the best known of the native animals. Occurring in great numbers in the vast oak, beech and hickory woods of eastern North America, from southern Canada to the Gulf, he provided easy meat for the pot and passable fur for articles of clothing. The pioneer knew him as the "Gray" or "Cat" Squirrel, "Silver-tail" or "Grayback."

Although the general effect of the pelage is gray, close examination reveals that each hair of the outer fur really is made up of four colors — slate at the base, followed by brown, then black, then tips of white. The hairs of the tail have a brown base, bordered with black, and finally white. Thus it appears that our common "Gray"

Squirrel really has a coat of many colors! To complicate matters, there is also a Black Squirrel which is merely a color phase of the Gray Squirrel. This caused much confusion among the early naturalists, many of whom considered the black phase a separate species.

Whether his color is gray or black, the Gray Squirrel's scientific name is *Sciurus carolinensis,* bestowed upon him in 1788 by the French naturalist Gmelin, who took a gray specimen from "the Carolinas" as his type. The generic name is formed by joining the Greek word *skia,* meaning "shadow," with *oura,* meaning "tail," into the latinized *Sciurus.* A free translation of *Sciurus carolinensis* is "The creature from Carolina that is shadowed by its tail."

Audubon and Bachman, in their classic work on American mammals,[1] called the Gray Squirrel of New York and Pennsylvania *Sciurus migratorius,* taking it to be a different species entirely from the Carolina race. However, unlike so many naturalists of that day, they recognized that the Black Squirrel was simply a color phase of the typical Gray, and not another species.

In those pioneer days of two centuries ago, eastern North America, with its great nut forests, was a paradise for Gray Squirrels. Early accounts give some idea of the incredible numbers that existed in various areas.

In 1749, for instance, the Gray Squirrel was so plentiful in Pennsylvania that he was a menace to crops, and a three-pence bounty was paid for each pelt. In one year 8,000 pounds sterling (equal to 640,000 squirrels) was paid in bounties in that State alone. Squirrels caused so much damage to Ohio cornfields that the State allowed county taxes to be paid in squirrel scalps in 1808-09.

Accounts of pioneer squirrel hunts tell of almost unbelievable numbers killed. Two teams of six Kentuckians went on a week's hunt in 1840 and tallied 9,780 squirrels! A day's hunt in western New York State tallied 2,000 in 1804. Ernest Thompson Seton estimates the Gray Squirrel population as one billion animals or more in 1800.

These huge figures do not seem excessive when one thinks of the great areas of the Mississippi Valley and the Middle Atlantic states that were then covered by dense lowland nut woods – ideal living space for Gray Squirrels. In contrast, their near relative the Fox Squirrel prefers hills and more open ground, and the Red Squirrel, or Chickaree, likes the coniferous forest.

As the colonists pushed westward and cleared more and more land, the number of Gray Squirrels inevitably decreased. This downward trend was accelerated by the great lumbering operations after the Civil War, which cut most of the forest lands, first in New England, then in Pennsylvania and its neighboring states, and finally in the South. One after another, the great stands of hickory, beech, chestnut and oak fell to the lumberman's axe. The Gray Squirrels would never have it so good again.

By 1900 they had become so scarce in many areas that some authorities thought they would actually become extinct. Yet this was too pessimistic a picture, for where he was protected, the Gray Squirrel flourished as before. In 1901 the squirrel population of the wooded areas of Central Park was estimated at 1,000,[2] a respectable number for 300 acres in the heart of a great

[1]Audubon and Bachman: The Viviparous Quadrupeds of North America, 1846.

[2]Seton: Lives of Game Animals, Vol. 4, p. 24.

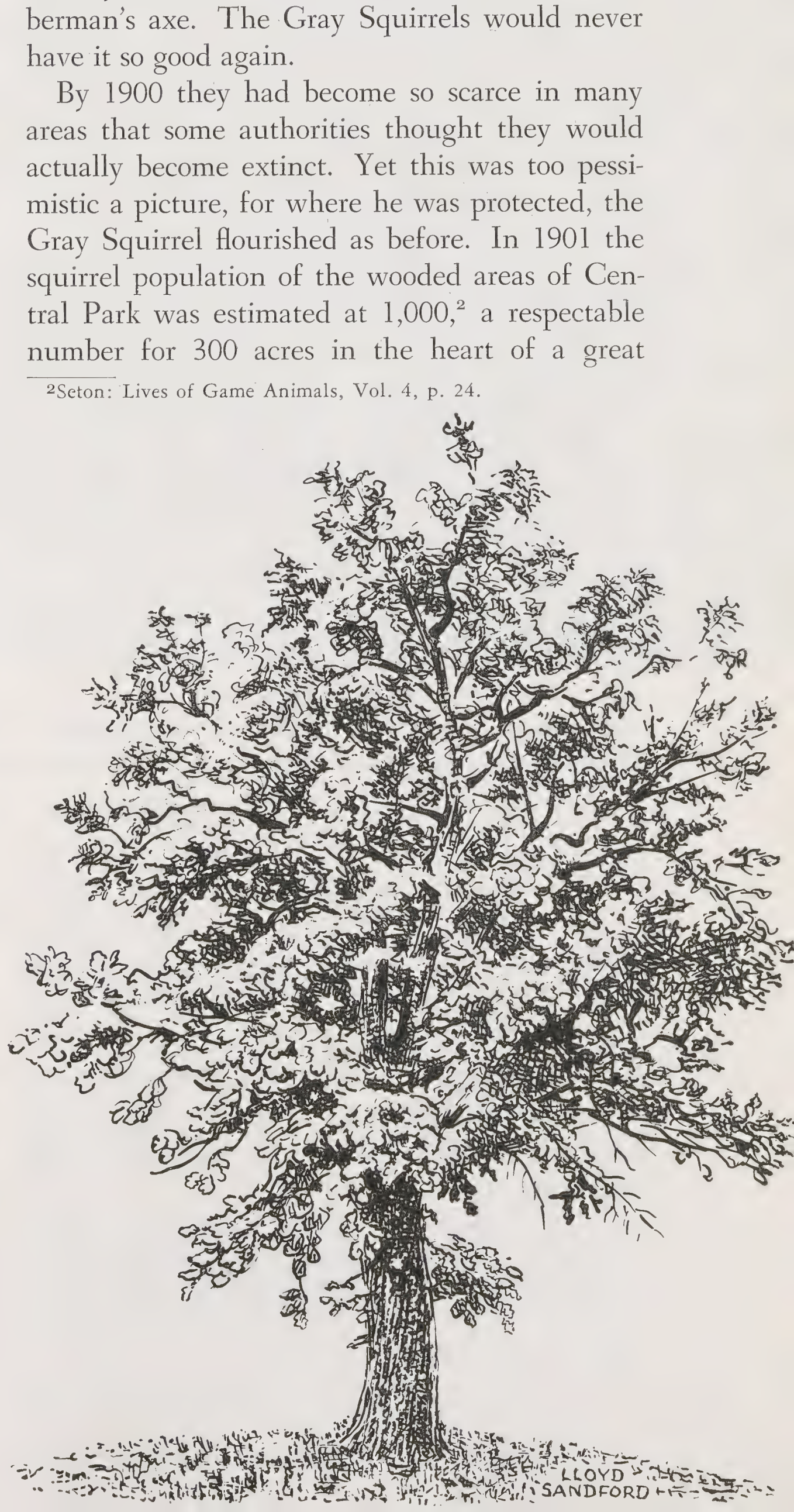


Photo E. P. Haddon: Fish and Wildlife Service

The Gray Squirrel population of the United States was estimated at a billion or more in 1800, but as the great stands of nut trees were cut down, its numbers inevitably declined.

city. At the present time protective laws seem adequate to insure its survival in goodly numbers in farm woodlots, parks and other suitable areas.

In Pennsylvania, for example, the 1950 squirrel kill was 546,574. This represents combined figures for the Gray and Fox Squirrels, but since the Fox Squirrel commonly occurs only in a few of the northwest counties of the State, Pennsylvania Game Commission authorities estimate that the Gray Squirrel made up about 95 per cent. of the total kill.

Their records for the past thirty years show that the squirrel take was over one million in each of 11 different years. In only three years was it less than half a million. No scarcity of Gray Squirrels in the Keystone State!

One of the phenomena which early settlers noted was the Gray Squirrels' sporadic migrations (or better, emigrations, as these movements were neither annual nor strictly seasonal). In these treks the squirrels of an area moved in un-numbered thousands, all going in the same direction. These movements have been likened to the lemming migrations in Scandinavia. Bachman, in picturesque and sonorous language, describes the havoc they wrought during these times:[3]

The farmers in the western wilds regard them with sen-

[3]Audubon and Bachman: Viviparous Quadrupeds of North America, Vol. 1, p, 271.

sations which may be compared to the anxious apprehensions of the Eastern nations at the flight of the devouring locust. At such periods which usually occur in autumn, the squirrels congregate in different districts of the far Northwest; and in irregular troops bend their way instinctively in an eastern direction. Mountains, cleared fields, the narrow bays of some of our lakes, or our broad rivers, present no unconquerable impediments. Onward they come, devouring on their way everything that is suited to their taste, laying waste the corn and wheatfields of the farmer.

As Bachman implies, Grays can swim, though somewhat deep and awkwardly. Many become exhausted and drown while crossing wide rivers, while others cling precariously to bits of driftwood or dead branches, and drift downstream. In this connection Bachman solemnly but disapprovingly notes that:

It has been asserted by authors, and is believed by many, that they carry to the shore a suitable piece of bark, and seizing the opportunity of a favorable breeze, seat themselves upon this substitute for a boat, hoist their broad tails as a sail, and float safely to the opposite shore.

One of the greatest of these squirrel treks within man's memory was the great 1842 migration in Wisconsin, which lasted four weeks. Seton, knowing that the migration took one month to pass, figures the number of squirrels (erroneously, I believe) from the description of an eye-witness, as follows:[4]

"Allowing that the squirrels traveled five miles a day, we have an army 130 miles wide, 150 miles long, in which as many as 1,400 might be seen by the road within two miles. That road must have been through the woods; therefore 20 yards on each side would be the limit of view. This would mean 30,000 to the square mile, or 450,000 squirrels." [5]

Whether we agree with these computations or not, it is certain that vast numbers of squirrels were present.

Not all the great migrations occurred long ago, however. They are still observed occasionally. Seton tells of a huge army of squirrels in Pemiscot County, Missouri, traveling west in 1914. This army, averaging about one squirrel to a square yard, was three-quarters of a mile wide and one-quarter mile deep. He estimated that they traveled at the rate of eight miles a day, and marched twenty-five miles or more in their trek. Hamilton[6] tells of squirrel migrations in 1933 and again in 1935 in Connecticut and New York, all moving west. He states that thousands were drowned crossing the Connecticut River, or killed by cars while crossing highways. In 1946 a considerable migration, moving southwest, took place in Wisconsin.[7]

What caused these great movements? It was long thought that food shortage was the reason, but more recent investigations tend to show that it was simple overpopulation of an area. These treks usually took place in the late summer or early fall when the young of the year were old enough to travel, and when food was most plentiful. The squirrels were usually sleek and well-fed. After squirrels have moved out of an area, it has few squirrels for several years, but gradually they build up again, other things being equal, to their old numbers. Calahane suggests that squirrel populations in some areas seem to vary in five-year cycles.[8]

Its adaptability and decorativeness as a park animal has caused the introduction of the Gray Squirrel into many other parts of the world. In England, for example, the Gray Squirrel was introduced about fifty years ago in the area of Rossett. Since then, it has thrived and spread, sometimes occurring with the common European Red Squirrel, and at other times taking over the native squirrel's territory, from all indications. In many introduced areas Grays have become a nuisance, for their habits in the new environment are somewhat unpredictable. For example, Hamilton states that the Gray Squirrel's bark-eating trait is more pronounced in England, and that it does considerable damage to orchards and fruit trees in some areas.[9]

At the turn of the last century, squirrels were introduced into South Africa, too, in the area of Capetown.[10] There, according to one authority, Bannertail has "multiplied, now overruns Cape Peninsula, and become a pest."

Taxonomists separate the Gray Squirrel into five sub-species, or races: the Southern Gray Squirrel *Sciurus carolinensis carolinensis,* originally described by Gmelin, which ranges from Delaware west to Illinois, and south to central Florida; the Northern Gray Squirrel, *Sciurus carolinensis leucotis,* a larger and brighter variety

[4]Seton: Lives of Game Animals, Vol. IV, p. 23.

[5]I can only conclude that Seton's figure of 450,000 squirrels is a misprint; my own computations from the same data give 585,000,000 squirrels.

[6]Hamilton: American Mammals, p. 228.

[7]*Journal of Mammalogy,* Vol. 28, 1947, p. 401.

[8]Cahalane: Mammals of North America, p. 400.

[9]Hamilton: American Mammals, p. 143.

[10]*Proceedings of the Zoological Society of London,* Vol. 120, 1950, p. 265.

Photo Zean Gassmann

Olney, Illinois, calls itself "The Home of the White Squirrels," and its squirrel population is estimated at nearly 1,500. They apparently stem from a white-and-cream pair mated in 1902.

which ranges from Ontario and New Brunswick south to Virginia, and west to Wisconsin and Michigan (Bachman called this race *Sciurus migratorius*); the Western Gray Squirrel, *Sciurus carolinensis hypophaeus,* from the vicinity of Minnesota, a darker form; and finally the smaller Florida and even darker Louisiana forms, *Sciurus carolinensis extimus* and *Sciurus carolinensis fuliginosus,* respectively.

The Northern Gray Squirrel, the race common in this area, has a typically pepper-and-salt pelage with pearly gray underparts. Often the flanks, feet and face are tinged with buff. In winter the fur usually is much thicker, paler and grayer, and there are conspicuous white tufts of fur at the back of the ears. The average length of an adult is about 18 or 20 inches, half of which is tail, and the weight may vary from ¾ to 1½ pounds.

The black phase may occur in the same litter with ordinary Grays. Blacks are more plentiful in the northern limits of the range, and are quite often seen in various areas about New York City. Colonies of Blacks are recorded from Battle Creek, Michigan; Greenwood, South Carolina; and Bloomfield, New York. A century ago, Black Squirrels were generally much more plentiful in Pennsylvania and New York than they now are.[11]

Besides these two color phases, albino squirrels occasionally occur, and several communities have thriving colonies of them. Olney, a town in

[11] Rhoads, S. N. The Mammals of Pennsylvania and New Jersey, pp. 52-56.

southern Illinois, calls itself "The Home of The White Squirrel," and claims nearly 1,500 albinos in the local squirrel population. The history of this colony is an interesting one.[12]

According to local records the first White Squirrel was discovered in the area about 1902. This individual had a cream-colored mate. The pair was captured and exhibited for a while in the window of a local saloon. Later the squirrels fell into the hands of local boys and were allowed to run loose. The cream-colored male was killed, but his white mate reared a litter, the start of the present colony.

In a recent letter, Zean Gassmann of Olney states that the White Squirrels "breed with the Gray Squirrels, which are also numerous, but we have never noticed any mixture in their coloring, the offspring being either gray or white. They are albinos and their eyesight is poor. They are frequently run over by cars. . . . The state game law forbids their taking at any time."

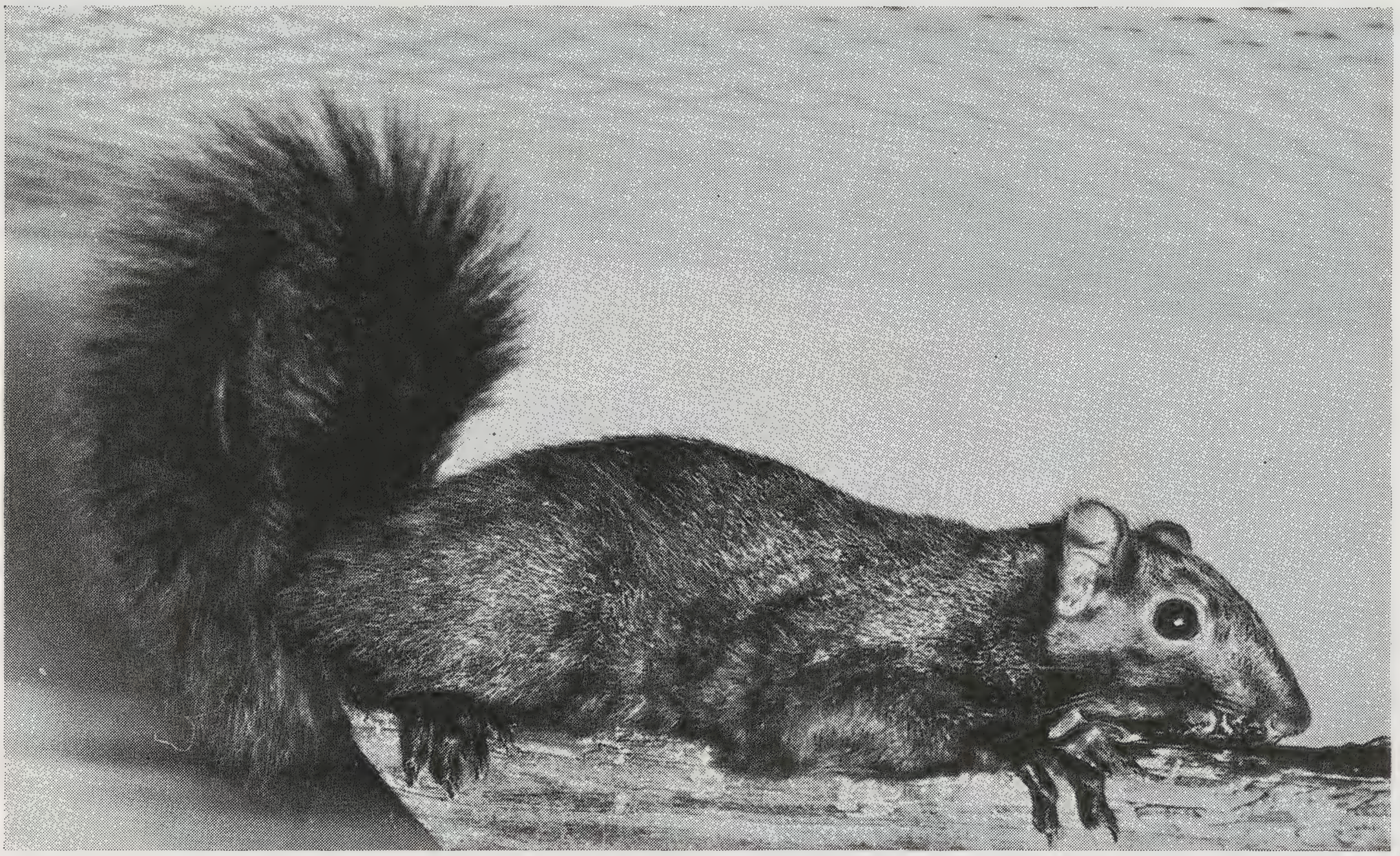
Squirrels of intermediate hues do occasionally occur, however. I have seen skins which range from almost pure white to cream or buff which shades into cinnamon on the sides and feet.

[12]White Squirrel Town. *Natural History*, November, 1949.

Among the charms of the Gray Squirrel (and sometimes an annoyance!) is his many-sided personality. Who has not enjoyed seeing one squirrel chasing another in mad rushes round and round a tree? This performance may usually be set down as just usual squirrel activity and play, but in early spring it may be part of the mating procedure. Another time the observer may see a Gray peering bright-eyed around the trunk, or "frozen," clinging vertically, head down, body quivering, with every hair on his tail sticking out like a brush. Then presto, he's gone.

Then again, he may be clinging to the very tip of a fragile branch, high above the ground, calmly eating buds, or giving his saucy scolding call.

Grays have several well-defined crys. When disturbed or excited they may give a series of harsh staccato barks, sometimes repeated many times, which resound through the woods. This has been interpreted as a warning call. When irritated, the squirrel can give a low, throaty "n'gr, n'gr," which changes to almost a purr, if his mood changes to one of pleasure. Defiant, he may utter a low growling "n'grrrr" interspersed with grinding of teeth and low chattering. His



Black Squirrels are merely a color phase of the Gray, and both Blacks and Grays may occur in the same litter. Blacks are fairly common around New York, even in Van Cortlandt Park.

voice instantly reflects his mood. The squirrel's "song" is his loud ringing bark, most usually heard in the early spring.

A Gray Squirrel's day begins in the early morning, when he is out foraging for food. This time, and late afternoon, are his most active periods. During the mid-day heat of summer he is apt to be taking a siesta deep in the woods.

Though their natural element is the trees, Gray Squirrels are very expert at quick dodges and turns on the ground. They have been clocked at 15 miles per hour on a run.[13] The usual ground gait while foraging consists of several zig-zag foot-long hops. Then the squirrel stops, jerks his tail abruptly, and sits up. After peering about, he continues hopping. When speeding, each jump may be increased to three to five feet.

The squirrel's tail, which he combs and fluffs tirelessly, helps him to keep his balance high in the branches and helps to break his fall if he does slip. Squirrels have been known to fall eighty feet or more, seemingly with no ill effects. In falling, the body is flattened, feet and tail spread, the whole acting somewhat as a parachute.

His home territory, or range, is usually fairly restricted. The usual Gray may have only three or four acres which are his every-day stamping grounds. Indeed, his whole life may be spent in a 100-acre woodlot. Homing experiments have shown that some, though by no means all of a number of adult squirrels carried as far as 14,800 feet from their home territory, may find their way back again.[14] In the great migrations, of course, squirrels sometimes move many miles from their former grounds.

Bannertail's food consists of a great variety of edibles, mostly vegetable, but including some insect material and occasionally eggs or young birds. In spring, the swelling buds and flowers of many trees — such as elm, oak, and maple — are his favorite foods. The sap is relished, too. In summer, when food is plentiful, Grays have been known to eat practically any kind of edible seed, fruit or berry. The germinal portions of whole yellow corn is a special delicacy, as are mushrooms. Sometimes, if squirrels are numerous enough in an area, they may do much damage to crops.

[13] *Journal of Mammalogy,* Vol. 12, 1931, p. 70.
[14] *Journal of Wildlife Management,* Vol. 5, 1941, p. 458.

In the fall his favorite foods are nuts — such as hickory nuts, hazelnuts, beechnuts, walnuts, and acorns which he takes off the tree, or gathers upon the ground. Those which he does not eat immediately he buries in the ground against some future need, digging a hole and tamping down the earth over the nut, or he may wedge the nut into some crack in the bark of a tree. During the winter he forages for whatever he can find — nuts that he has buried, bark from young trees, insect pupae, and other such fare. He has been seen to tear pine cones apart for the seeds.

He lays aside sizeable amounts of food for winter use — mostly nuts. Does he remember where he buried the nuts, find them again by chance, or by smell? It has been estimated that one Gray Squirrel may bury or hide several thousand nuts in a season — a fact which gives him the crown as the champion nut-tree propagator. A great portion of the buried nuts are never recovered and in due time may sprout and grow into trees. Thus the Gray might well be called Nature's own Johnny Appleseed! The nuts which he does recover are probably found by means of his keen sense of smell, for it is highly improbable that an animal with the limited mentality of a Gray Squirrel could remember where he had hidden his nuts. He usually drinks one or more times a day.

The Gray Squirrel may make his home in a tree hollow, or in a leaf nest, one nest to a tree. In general, the nests in tree hollows, usually in oaks, are more often utilized in the northern part of the range, especially during cold weather.

The oval, bulky, leaf nests, usually 25 to 50 feet above the ground, are constructed of leaves and fresh-cut twigs, firmly woven together, and with such a thick layer of leaves that they are fairly waterproof. There is only one entrance. The innermost lining is a soft mattress of shredded bark and leaves. Here the early spring young are born. If a nest is built only for summer residence, it may be much looser and not so carefully constructed as the winter nest.

In the south two litters each year are the rule, while in the north there is usually only one. In this vicinity the majority of young are born in March and April, after a gestation period of 44 days. However, some young may be seen in late

(*Continued on Page* 127)

KILIMANJARO, WITH WILDEBEESTS

The Best Trophies of Africa

Photographs by
FRED A. WARDENBURG

MANY YEARS AGO Fred A. Wardenburg, a long-time friend of the Zoological Society, came to the conclusion that photographs are better trophies of wild game than heads collecting dust on the wall. In 1948 and again in 1950 he made photographic safaris through East Africa and the privately printed accounts of his trips make it abundantly plain that it takes more skill and ingenuity to hunt with a camera than with a powerful rifle. And the game he "shot" is still there, to delight those who come after. . . .

Some of Mr. Wardenburg's trophies are displayed on this and the succeeding three pages, together with notes about the situations under which they were "bagged."

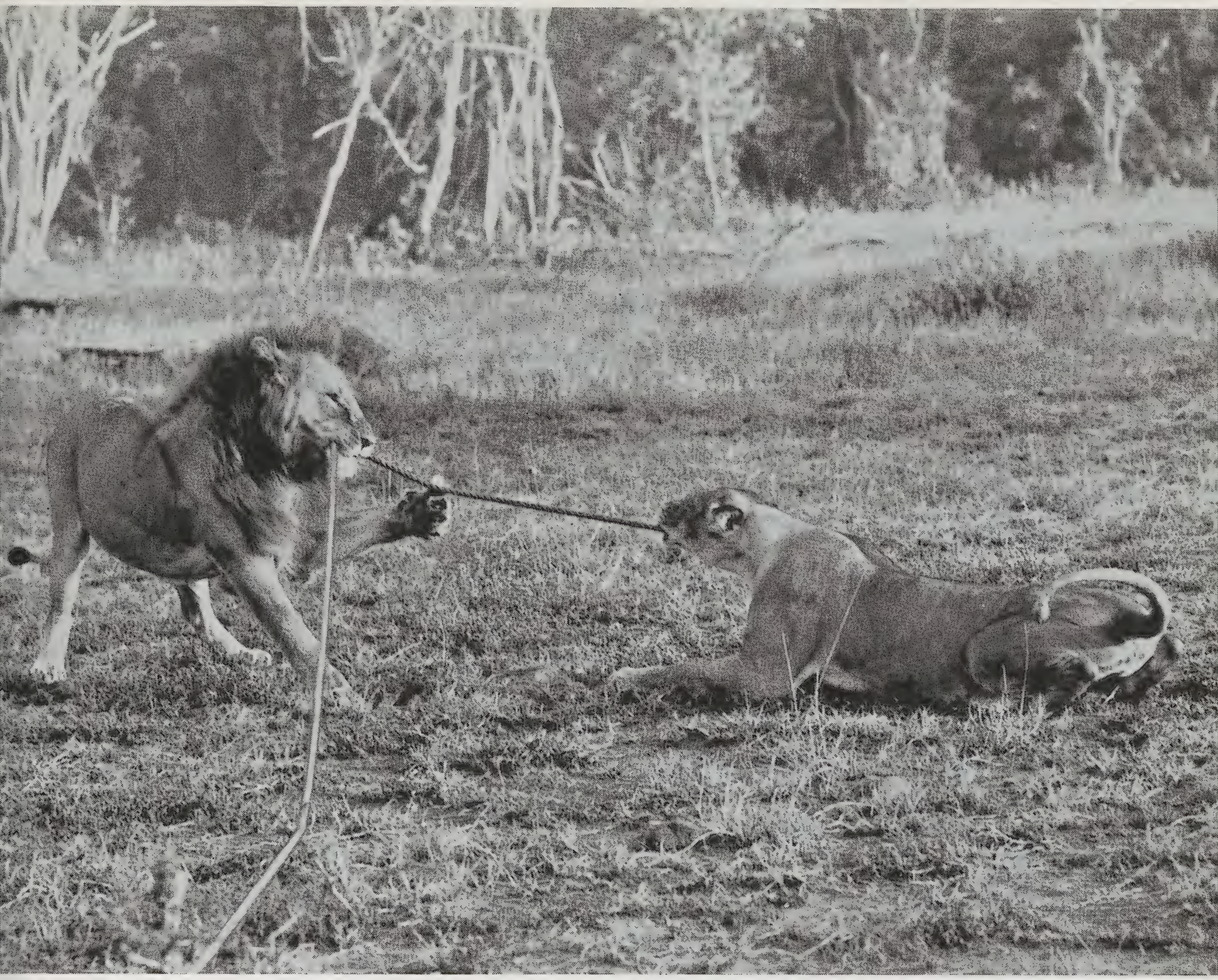
KILIMANJARO, WITH WILDEBEESTS. Once in a lifetime is it given to a photographer

CONTENTED LIONESS

to make such a picture as this: Kilimanjaro virtually free of clouds, and in the foreground a herd of Wildebeests steady enough to allow the photographer to get within range. This, the highest mountain in Africa, soars 19,580 feet up to the clouds and for days on end it may be mist-shrouded. Then, the cloud lifts and a photographer with all the luck in the world happens to be there when the wild game drifts past.

CONTENTED LIONESS. This picture was the result of "one of four experiences with Lions and trees out of 300 Lions I have seen," Mr. Wardenburg comments. "We found her in the late afternoon. She was about 18 feet above the ground. The trunk of the tree made an angle of about 60 degrees with the ground. She took no alarm or offense at our presence at a distance of about 50 feet. I made several pictures, after which she rose leisurely, walked along the branch, took one step down the trunk and jumped with a resounding thud to the ground.

"My first experience was, similarly, with a Lioness on a sloping trunk, and she went down



WELL-FED AND PLAYFUL

immediately when we arrived. Then, in the Congo, we saw a large maned Lion in a tree, fully 25 feet above the ground. Syd Downey, my white hunter, said it was the only time he had seen a *Lion* in a tree.

"In the fourth experience, we had hung a kill in a tree for a Leopard picture which we never got. The bottom of the kill was about 10 feet above the ground and hanging free about 3 feet from the tree trunk. We came upon a Lion and a Lioness at the foot of the tree early one morning. The Lion made off into the bush at once. I saw the Lioness jump up on the vertical trunk, hold herself with her claws, and reach out and take a healthy bite from the kill. She then let go with her claws, swung entirely free, hanging to the kill until the meat parted and she dropped to the ground with her bite. I saw her do this twice."

WELL-FED AND PLAYFUL. There is a surprising amount of play in certain wild animals — in Lions, for example. This particular pair had been lured within camera range by meat dragged

MASAI GIRAFFES

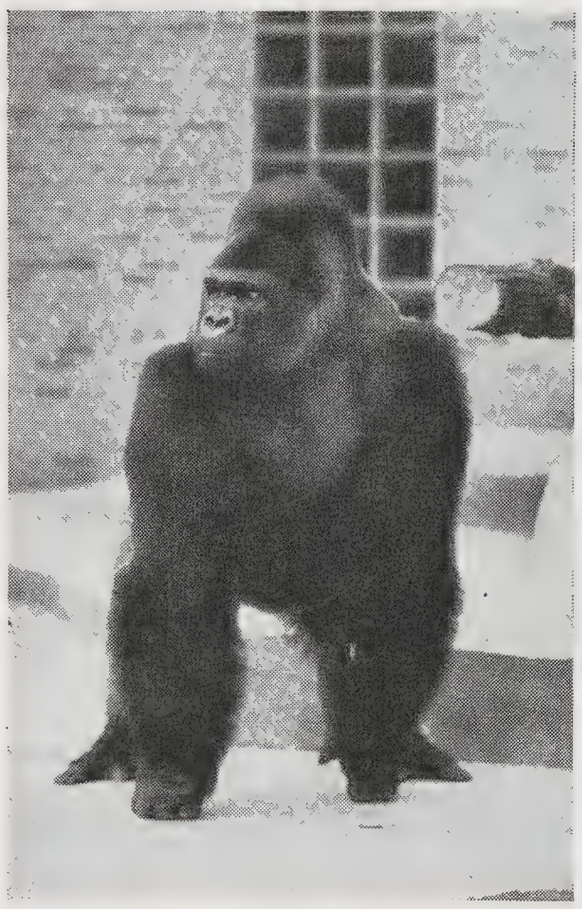
behind the photographic car and after they were satiated the dragging rope attracted their attention. Some of their games with the rope were reminiscent of a cat's play with a string, and then there were tugs-of-war when the Lion and the Lioness tugged and pulled each other.

MASAI GIRAFFES. Giraffes are, with their height that may reach 18 feet, easily the world's tallest animals. That is all right when it comes to browsing off the tops of trees and plucking leaves from tall-growing bushes, but it is a minor disadvantage in feeding close to the ground – as the Giraffe often does. In low-feeding or drinking, the Giraffe simply arches its neck and spreads its forelegs wide apart. "There is," Mr. Wardenburg commented, "plenty of power in those forelegs. A kick is lethal, so a Lion must be desperately hungry before he will tackle a Giraffe. The gallop of a Giraffe seems most awkward, but it takes the animal over the ground at a surprising rate."

The Loss of Makoko

By LEE S. CRANDALL

HOW STRONGLY our animals and their welfare are impressed upon the national consciousness was strikingly demonstrated by the reaction that followed the accidental drowning of Makoko, our superb Lowland Gorilla, on May 13, 1951. We ourselves were barely recovering from the impact of the shock when the first of an avalanche of letters of condolence and well-meant suggestion came pouring in.



MAKOKO

Obviously, in the face of this overwhelming disaster, something had to be done to make certain that nothing of the sort should happen again. This necessity evidently occurred to a great many persons. Rather curiously, the thinking of a majority of those whose kindly motives impelled them to graphic expression, followed almost identical lines. This widely popular idea had to do with nets which were to be placed at various levels in the water of the moats. Either stationary or controlled by pulleys or springs, they were to support a submerged animal or eject him to the safety of dry land. The single exception to this almost universal plan was a suggestion that the moats be instantly drained if an accident should occur.

Both general ideas, of course, were perfectly sensible. That is, they would be if the mechanical difficulties involved could be overcome, and if it were recognized that under-water support might enable an animal to escape or enter neighboring compartments.

Fortunately for us, when the water-filled Great Apes moats were first planned, an alternate method of construction had presented itself. If for any unforeseen reason the lovely, open stretches of water should prove impractical, the wing walls separating the enclosures could always be extended to the outer walls of the moat. This would provide the same security as before, but on a dry-moat basis. Our basic thought here was that the necessity for purifying and re-circulating a body of water so large might place too great a strain on any pumping facilities we could provide. As it turned out, the system was never tested under summer conditions.

After the accident we resurrected the dry-moat idea, and with our ready-made plan in hand, details and specifications were quickly drawn up by our architects, Embury & Lucas. On July 5 the actual work of construction was begun by Matthew L. Carroll, Inc. By late summer or very early autumn, our great apes should be enjoying their outdoor enclosures in complete safety.

Extension of the dividing walls will still maintain the established ten-foot clearances from all points. The faces of the moat walls will be broken back and the simulated ledges of the enclosure floors will be carried down below the visitor

The moat around the outside enclosures of the Great Apes House was like this originally, with the water (the moat is dry in this drawing) at a depth ranging from three to six feet.

sight-line. The bottom of the moat will be flooded with circulating water to a depth of 18 inches for the larger animals, 6 to 12 inches for smaller ones. The purpose, of course, is to prevent the occupants from remaining out of sight.

For the provision of much-needed shade in the three large enclosures with full southern exposure, flat-topped concrete tables, irregularly oval in shape and known to us as "three-legged mushrooms," will be installed. When recumbent tree branches are placed above them, it is felt that they will add a welcome note to the general decor as well as being definitely functional.

With this solution of the practical aspects of our problem well on the way to realization, it appears that some final word should be said concerning Makoko's fatal accident. Many fanciful accounts were written and widely disseminated. Recently, European zoologists attending the convention of the International Union of Directors of Zoological Gardens were found to be greatly confused by the report, printed by many newspapers, that the animal had committed suicide. Since such an act, in the human sense, could not properly be attributed to an ape, no sensible deduction could be made from the stories. For this reason, if for no other, a more factual account should be recorded here.

On the afternoon of Sunday, May 13, all of the apes were in their outdoor yards and had attracted a massed crowd of several hundreds of enthralled visitors. Just before three o'clock, Makoko stalked, stiff-legged, to the southeastern corner of the moat-edge. Awed by his nearness and majestic appearance, the crowd fell silent. Makoko stared at his audience for a moment, then turned and started toward the building. As he moved at a slow, playful gallop along the 12-inch coping of the moat-edge, a projecting ledge caused him to restrict the placing of his left hand. When the right came forward, it could not find space and slipped off the edge. This sudden loss of balance upset Makoko, causing him to fall sidewise into the water with a tremendous splash.

Six keepers were on special duty in the area and two stood directly in front of Makoko's enclosure. As he plunged in, they stood transfixed, expecting to see the animal seize one of the stout cables strung just below the water line. But Makoko made no effort to save himself. Just

once, his hands and occipital crest broke water and that was all.

Everyone, of course, dashed to the rescue. The first to reach the moat side happened to be George Scott, Head Keeper of Birds, who was on the scene only by chance. Without hesitation Scott, although barely able to swim, dove into the six feet of water. He managed to find one of Makoko's hands and get it to the surface. The other keepers, under the supervision of August Schilling, Head Keeper of Mammals, then dragged the 448-pound animal to the enclosure floor.

After reconstruction the moat will look like this. Water will stand at a maximum depth of eighteen inches—sufficient to keep the animals from staying out of sight under the guard wall.

Keeper Andrew Winnegar, a Red Cross instructor in swimming, life saving and water safety, directed immediate first-aid treatment. Dr. Goss was quickly on the scene, followed by an Emergency Crew of the Police Department. But Makoko, after five to ten minutes of submersion, was beyond aid. He had not committed suicide, he had not been frightened by the crowd, he was not making a desperate effort to reach Oka, his lifetime companion. He was simply the victim of an almost unbelievably ordinary accident.

A point of special interest was established by this tragedy. Experience here and elsewhere has established that under zoo conditions, at least, Chimpanzees, Orang-utans and Gibbons do not swim. No information was available concerning the aquatic abilities of the Gorilla but there seemed to be no reason why it should differ in that respect from its relatives. That it does not is now amply demonstrated.

Following the accident, a scene in the new Vincennes Zoological Park in Paris came constantly to mind. A large outdoor area, cut off by superbly done rock simulation, has been the summer home of a group of five or six young Chimpanzees for at least four seasons. Between them and the public lies a broad moat, with a sharp drop of three feet from the exhibit floor to the surface of the water, which is three feet deep at that point. What happened when these youngsters accidentally fell in? In June of this year, while

standing before this exhibit, with Professor Urbain, the Director, the question was put to him directly. The answer was terse: "They *don't* fall in!" Perhaps the key to the comparative alertness of Gorilla and Chimpanzee lies here.

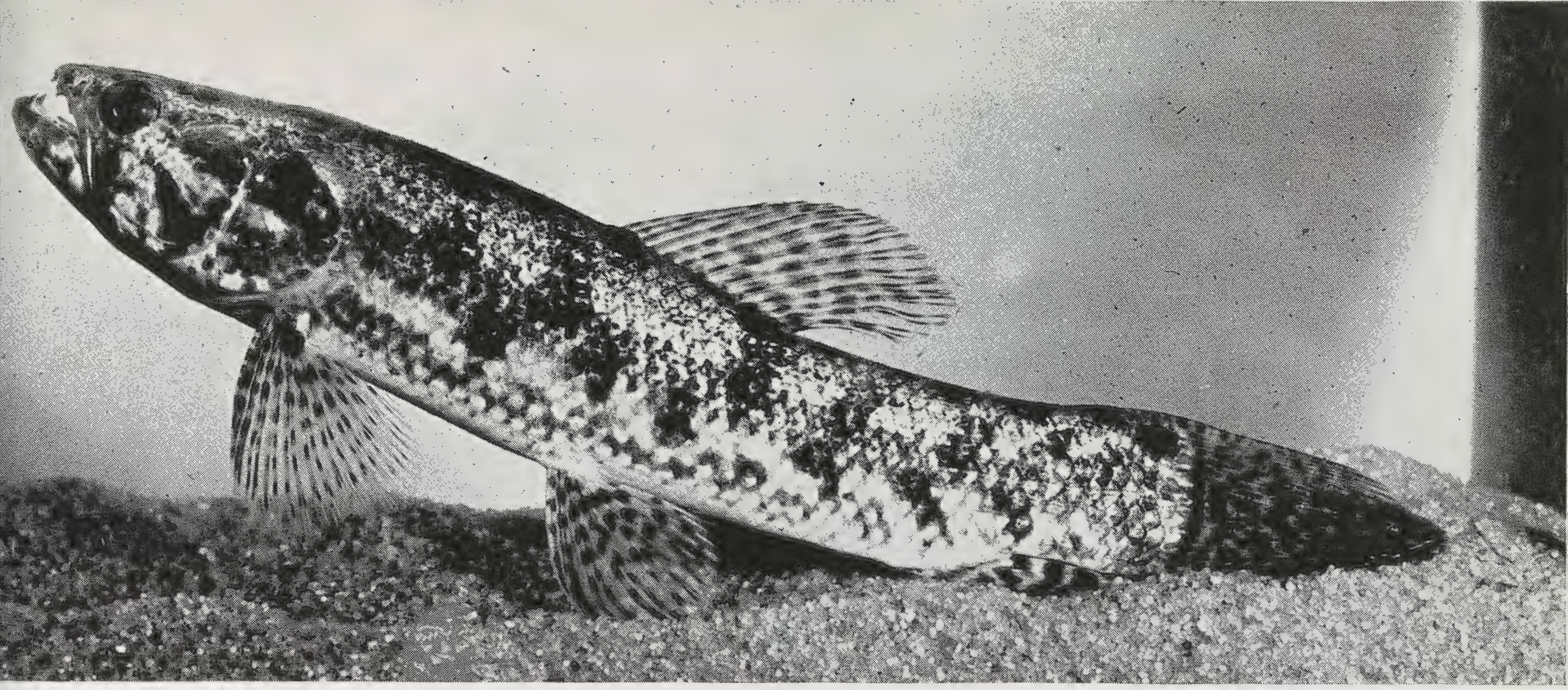
One final note: Oka is not dying from grief and never has given any evidence of danger that she might do so. Unfortunately, it probably is true that little Mambo, our new Lowland Gorilla acquired in May when he weighed only 16 lbs., 5 oz., will never replace Makoko in the affections of Oka.

and--

this is Mambo!

At the time of Makoko's death, two young Lowland Gorillas happened to be in the hands of an animal dealer in New York City. Both were males and the opportunity to acquire a "second Makoko" was obvious. General Curator Crandall and Dr. Goss inspected the two youngsters and finally selected the larger of the two, which had been given the name "Mambo" by the dealer. Physically the baby—probably a little more than a year old—was virtually perfect. A slight skin rash, which has yielded promptly to treatment, was his only discoverable blemish. Temperamentally, too, little Mambo appeared to be a good choice, for he was lively, bright, friendly, and without any of the moroseness that so often characterizes very young Gorillas. He is already developing, under the care of Mrs. Helen Martini in our Animal Nursery, into a spoiled, pampered, happy little Gorilla.

Now in our Animal Nursery, where he will remain until he becomes older and more self-reliant, Mambo follows a routine not greatly different from that of a human infant. He is fed four times a day; breakfast is cereal and milk with vitamin preparations added; at 10 A.M. he gets "all the things that are good for him but that he doesn't like," as Mrs. Martini puts it – a variety of vegetables. Noon is the time for fruits he *does* like, and in late afternoon the breakfast menu of cereal and milk is repeated. Baths (which he enjoys) come every day or every other day. Mambo's appetite is extremely good and as a result in one month he put on weight more than three times as fast as did Sumaili, our baby Mountain Gorilla. Mambo came to the Zoo on May 22 and weighed 16 lbs. 5 oz.; at the end of the first month he weighed 20 lbs. 3 oz.



THE BROWN CHARACIN

It's a Characin, But . . .

By JAMES W. ATZ

THERE ARE CHARACINS *and* CHARACINS. Some good and some not-so-good. If that seems like a self-evident statement, it certainly was not so recognized by the home aquarists who purchased the first Brown Characins that appeared on the American market a number of years ago. The experts had assured them that the small, mottled, brown fish, sulking in the corner, were really characins, and that was enough. Everyone knew what a characin was: it was a tropical fresh-water fish belonging to the family Characidae. This large group of fishes included such aquarium standbys as the Tetras, the Pencil Fishes and the Freshwater Flying Fish – all small, lovely, peaceful species that are hardy in captivity and thrive when kept with numbers of their fellows and other kinds of small fishes, as members of the "big happy family" which inhabits a community tank. Characins were just about the ideal community fish.

These new Brown Characins looked a bit strange – more like Mud Minnows than characins – but, anxious to try every new fish that appeared for sale and priding themselves on the number of new species they could maintain in a single tank, several fanciers purchased one or two Brown Characins and added them to their tanks.

It was not long before fish started to disappear without a trace. By the time his collection had been decimated, the unfortunate aquarist usually realized that the brown newcomers were doing suspiciously well, or perhaps he had gotten a glimpse (easy to miss unless the mouth happened to be open) of the three or four canine teeth on each side of their upper and lower jaws. The villain was identified, and once detected it was usually removed to solitary confinement or placed with companions too large to be seized and swallowed whole – for that is the method of feeding employed by this savage carnivore.

Nowadays the character of Brown Characins is recognized by dealer and fancier alike. When a half dozen recently turned up in New York, they were donated to the Aquarium; Weber's Tropical Fish Company of Brooklyn, who had received them along with a shipment of other tropicals, realized they were unsuitable for the average home aquarium.

Nevertheless, the Brown Characin is an interesting fish. Fed regularly and copiously on live food or on less expensive strips of raw meat or fish, it grows rapidly. In nature it reaches a length of more than three feet and at this size can mangle the hand or limb of an unwary fisherman. In its larger sizes it reminds one of nothing so much as the Bowfin or Freshwater Dogfish of North America, to which it is, however, not at all related. Despite its atypical behavior and appearance, the Brown Characin's internal anatomy proclaims it as true a characin as the familiar Neon Tetra or Three-lined Pencil Fish. Its peculiar behavior is carried over into its reproductive habits, too. Most characins simply lay their small, more or less adhesive eggs among aquatic plants and then seem to forget about them. The Brown Characin, on the other hand, cleans out a slight depression at the bottom of a pond or pool, deposits the eggs in it, and the male then guards nest and eggs against all comers.

Even the scientific name of the Brown Characin is queer. Although the fish inhabits much of northern South America, including outlying Panama and Trinidad, it is called *Hoplias malabaricus*. The specimen which Marc Elieser Bloch described in 1794 had gotten mixed up in a collection of East Indian species, and Bloch called it *Esox malabaricus*. The international rules of scientific nomenclature provide means for correcting generic names. Thus *Esox*, which legitimately belongs to the Pike and Pickerels, was eventually replaced by *Hoplias*. But the misnomer *malabaricus*, after the Malabar Coast of Southwestern India, must stand forever, a strange name for an even stranger fish.

Remember the Sloth!

SYMBOL OF INDOLENCE, the Sloth goes along upside-down and is not one of our more attractive exhibits at the Zoo. He sleeps all day and what we claim to know about his night life is chiefly hearsay.

Don't be a Sloth.

Send us more names of your friends who would enjoy membership in the New York Zoological Society. There must be scads of them and we can help so much to cheer their heat-ridden, politics-infested days.

Write to the:

MEMBERSHIP CHAIRMAN
New York Zoological Society
30 East 40th Street
New York 16, New York

News from the Conservation Foundation

Marine Resources Project Launched on July 1

Under a special grant from the Rockefeller Foundation we have long been planning a project to determine the types of research that are needed to discover additional sources of marine plant and animal life of use economically or otherwise to human progress.

Happily we announce the appointment of Dr. Lionel Walford, on leave from the U. S. Fish and Wildlife Service, to direct this important new activity of the Research Department of the Conservation Foundation. Dr. Walford began his work on July 1 and is now building his staff to start the project. Dr. Walford received his A.B. degree from Stanford in 1929 and his Ph.D. from Harvard in 1935. As an aquatic biologist he has served on the International Fisheries Commission, at the California State Fisheries Laboratory, in the U. S. Bureau of Fisheries and on the National Research Council as well as with the U. S. Fish and Wildlife Service.

Boy Scout Conservation Program To Be Launched in Fall

A comprehensive "learning-by-doing" program of conservation training for the Boy Scouts of America, which the Conservation Foundation helped to plan, has been approved by national officials of the Scouts. The program, projected over a three-year period, calls for a Director of Conservation at the national level, with sufficient budget for travel and promotional expense to establish the conservation ethic and practice throughout the great Boy Scout organization.

Mr. John Schiff, a trustee of the Society, has been elected President of the Scouts, and will preside at the September 7 meeting of the professional Scout training staff at Lansing, Michigan. At this convocation, President Fairfield Osborn will speak in introduction of the conservation program to the men who will in turn put it into operation regionally and locally.

This program should have great significance since the Scouts are the largest single organized segment of American youth. Nearly 3,000,000 strong, the boys and men who make up the Scout body represent nearly every community in the United States. Besides their resources of some 553 regional and local offices, their 2,800 trained field executives and their handbooks, magazines and other publications, the Scouts own nearly 250,000 acres in campsites available for use as conservation training grounds. It will be a relatively simple procedure, in view of these facilities, to launch the program throughout the land.

We are especially interested in the plan, not only because the Scouts will be the first organization to adopt a unified conservation program on a national basis, but because it is a youth organization and it is our firm conviction that conservation will progress chiefly as the youth of the country are alerted to its need.

John Gibbs Is Studying Audio-visual Aids

John C. Gibbs will attend a meeting at Chapel Hill, N. C., on August 7-8-9, under the auspices of the University of North Carolina, to study audio-visual aids now available for teaching purposes.

The Conservation Foundation's "three-minute films," with which we have been experimenting under a special grant, bear promise of opening a vast new field in the use of audio-visual material, warranting our greater knowledge of the whole range of such facilities. We have tested these short movies at Teachers College and in a number of typical schools, and hope to have a new and important teaching tool available in a few months' time.

Not only are three-minute films less expensive than longer pictures, but they have an unusual teaching value because they are designed to provoke class discussion or "audience participation," thus turning learning into a game rather than an exertion.

BEHIND THE SCENES

NEWS AND NOTES OF THE ZOOLOGICAL PARK, THE AQUARIUM AND THE DEPARTMENT OF TROPICAL RESEARCH

Pete Is Now 48 Years Old

Peter the Great (better known simply as "Pete"), our elderly Hippopotamus, was 48 years old on Friday, July 13, thereby adding another year to his record as the oldest Hippopotamus ever in captivity anywhere. In recent months his health seems to have improved, probably as a result of the change in his diet whereby a dry, pulverized hay and grain preparation was made into a watery soup that Pete could swallow easily. He appears to have regained the several hundred pounds of weight he lost three years ago before his diet was changed, and is more active than in several years past.

Nigrelli and Gordon to Conduct University Courses

Courses in Ichthyology, Fishery Biology, Genetics of Fishes and Fish Diseases are now being offered in the Department of Biology, New York University Graduate School of Arts and Science. The last two mentioned subjects will be given by Drs. Myron Gordon and Ross F. Nigrelli.

Record School Attendance

Spring normally brings a tremendous upswing of visits to the Zoological Park by school classes and organized educational groups, but a new record was set in May when we were visted by

Two of three specimens of the Colombian Giant Toad received at the Zoological Park on July 5, from the neighborhood of Ipiales, Colombia. The largest weighs 1 lb. 14½ oz., and is 17⅝ inches in total length. It may never have been exhibited alive in any zoological garden.

39,597 children and teachers, representing 890 classes and groups from 575 schools. The best previous record was in June, 1949, with 36,852 school visitors.

Memorial to Dr. Smith

A memorial exhibition of the published work of the late Dr. George M. Smith, Fellow of the Zoological Society and Research Associate of the Aquarium, has been arranged by Yale University and will be open throughout the summer in the Cushing Rotunda of the Yale School of Medicine in New Haven. Posthumously the King of Denmark awarded Dr. Smith the Cross of the Knighthood of Danneborg in recognition of his work in medical research.

* * *

Dr. Leonard J. Goss has been appointed by the State Board of Regents to the Board of Veterinary Medical Examiners for a period of five years.

Zoological Park Miscellany

A baby Murine Opossum, scarcely larger than a Mouse, is now thriving in the Animal Nursery. It was found on a New York pier as a banana boat was being unloaded, and was brought to the Zoo in a fruit jar. . . . "Cocky," the elderly Sulphur-crested Cockatoo that has delighted thousands of visitors by his tricks and exclamations of "Goodbye," died on May 26. Cocky was presented to the late Sam Stacey, for many years Head Keeper of Birds, some time before 1915. Another Sulphur-crested Cockatoo, a young and vigorous bird, was presented to us not long before Cocky's death, and shows promise of being a worthy successor. . . . A pup was born to Wendy, our prolific Sealion mother, on June 9. The baby is Wendy's sixth. . . . A model of the new Aquarium, and three large oil paintings of exhibits planned for the institution, by Carl Burger, have been set up in the Heads & Horns Museum.

New Members of the New York Zoological Society

(Between May 1 and June 30)

Life

John Elliott
Eben W. Pyne

Contributing

Mrs. Philip E. Allen
Mrs. Otto E. von Au
Walter Beinecke
Howes Burton
William Callan
Mrs. Huguette M. Clark
Miss June M. Gill
John E. Hartz
Mrs. Fanny Hatvany
Mrs. Edward F. Hutton
Miss Helen Judson
Mrs. Chaster B. Koontz
Nicholas K. Lucas
Dr. James D. Maxwell
John P. McLaughlin
Richard H. Migel
Mrs. George P. Milmine
Mrs. Jean Model
Garry Moore
Mrs. Edward E. Murray
Bradford Norman
Mrs. Hardin Orvis
Earl D. Osborn
Countess M. Revedin
Mrs. Francis M. Sedgwick
Mrs. Hammond Speiden
Frederick J. Stawitz
T. Raymond St. John
J. G. Phelps Stokes
James G. Timolat, Jr.
Kurt H. Volk
Frederick M. Warburg
Mrs. Alexander Williams

Annual

William B. Adams
Mrs. S. L. M. Barlow
Mrs. A. Victor Barnes
Robert B. Bicher
Robert Blauner
Mrs. William C. Bowers
Leo Brecher
Miss Janet Zaph Briggs
Mrs. P. F. Brundage
Miss Anne Hoe Burlingham
Mrs. Joseph Campbell
Mrs. Cass Canfield
Master Daniel Churchill
Mrs. William Hugh Coverdale
Mrs. Isabella M. Craig
Mrs. Guernsey Curran
Mrs. Albert B. Dickinson
Miss Marietta Joan Dondero
Mrs. Jean M. Dorsey
Lewis W. Douglas
Mrs. Allen Welsh Dulles
Mrs. Malcolm J. Edgerton
Mrs. Edward Fitzgerald
James L. Gerrie
Mrs. Robert B. Hale
Tobias Heller
Dr. John R. Herman
Mrs. Walter A. Hirsch
Mrs. John Hubbard
Mrs. Lily B. Javits
John P. John
Roy E. Jones
Junzo Kawashima
John Paul Kehoe
Hideichi Kitao
Miss Deborah A. Ladd
Mrs. S. H. Marsh
Mrs. Gunnar Maske
Thomas N. McCarther, Jr.
H. Kane McVickar
Mrs. Charles Minoff
William D. Mitchell
Miss Augusta F. Mueller
Miss Louise M. Mueller
Miss Patricia Noack
Miss Sylvia Pertz
G. M. Phelps, Jr.
Milton Rains
Mrs. Fergus Reid, Jr.
Mrs. Paul Renshaw
Mrs. Franklin G. Smith
Herbert C. Smyth
Miss Sarah Southern
John Sherwood Sparrow
C. R. Steyer
Mrs. Jay Stillman
Miss Jane Valleau
Luis S. Varona, Jr.
W. K. Walss
Mrs. John H. Zimmerman

Four female cubs were born May 10 to Dacca, our Tiger mother. They were her fourth litter, and since 10 cubs had been born in the previous three litters and Mrs. Helen Martini of our Animal Nursery had run out of names, the newcomers were named Gara, Bara, Thera and Choudha, meaning 11, 12, 13 and 14 in the Indian language. Sandra, a young Orang-utan in the Nursery, watched with great interest while Mr. and Mrs. Martini removed the cubs for weighing.

Our Red-billed Blue Magpies Lead An Adventurous Life

During the great storm of last November 25 two Himalayan Red-billed Blue Magpies in our collection were literally blown out of their out-of-doors cage when a glass wall was shattered, and were at liberty for 24 hours. They were recaptured when they came back for food.

Subsequently we presented a pair of these magpies to the New York Botanical Garden. It may have been the same pair that escaped during the storm – we don't know. Anyway, the Botanical Garden's pair escaped, too, as a result of a cage accident. But this pair didn't come back. Instead, it built a nest in one of the Garden's trees.

We have been watching the nest, figuring on seizing the three young and the parents when the nestlings were well along in their development. Neighborhood boys anticipated us; on July 12 a bird-watcher reported that he had frightened several boys out of the tree and that they had told him a companion already had one nestling.

Obviously it was necessary to move rapidly, or the young birds would be stolen and would have little chance of surviving in the hands of inexperienced boys. Within half an hour a "rescue" party from the Zoo had removed the nest and the two remaining birds, which appeared to be about two weeks old. They accepted food without reluctance, and if they thrive we hope to use them as lures to recapture their parents, for while the magpies might survive a New York winter their size and bright coloring make them a too-obvious target for hawks and predatory small boys.

PUBLICATIONS OF INTEREST

A FIELD GUIDE TO THE BUTTERFLIES. By Alexander B. Klots. Illustrated with color paintings by Marjorie Statham and photographs. 349 pp. Houghton Mifflin Co., Boston, 1951. $3.75.

This is probably the most useful book on American butterflies that has appeared since 1898, when Holland's classic *The Butterfly Book* was published. One of the Roger Tory Peterson Field Guide Series, it follows the same general plan as Peterson's justly famous field guides to the birds, and includes the butterflies found east of the Great Plains, from Greenland to the Mexican boundary. For each species there is a short account of characteristics, range, and life history notes as far as known. All recognized subspecies are listed. Best of all, North American butterfly taxonomy is brought up to date. The excellent illustrations, 247 of them in full color, show 417 species. Valuable introductory chapters discuss all the main aspects of butterfly natural history and collecting. Handy indices list technical terms and larval food plants as well as the butterflies. All in all, an invaluable reference and field book for any naturalist's library. – R.M.M.

AUDUBON WATER BIRD GUIDE. By Richard H. Pough. Sponsored by the National Audubon Society and published by Doubleday & Company, Inc., Garden City, New York. 1951. 458 illustrations in color by Don Eckelberry and 138 black and white by Earl L. Poole. 3 maps. xxviii + 315 pp. Price $3.50.

A fitting field-book companion to the previous volume devoted to Eastern Land Birds. Under the present title, Mr. Pough covers not only the aquatic birds of the eastern United States and Canada but also the Vultures, the Hawks and Eagles, the Upland Game Birds and the Doves and Pigeons. There are no keys but the excellent illustrations and the field distinctions noted for each species make identification simple enough. Habits, voice, nest and range are adequately described.

—Lee S. Crandall.

WIND RUNNER: The Story of an African Antelope. By G. W. Barrington. 160 pp., 16 drawings by the author. Longmans, Green & Co., New York, 1951. $2.50.

Adventures in the life of a young Impala on the plains of Africa, with a good deal of natural history as well as exciting story. This should be interesting to children, since the central character is an animal seldom written about and Lions, Leopards, Elephants and Wild Dogs, as well as natives and white men, are brought into the story quite naturally.

The Gray Squirrel

(*Continued from Page* 110)

August and September, too. During the breeding season, there is considerable fighting among the males. The victor wins his mate, but the pair stay together only temporarily. Gray Squirrels are promiscuous. There is no pairing for life, or even for the season. Adults of either sex may mate with many different individuals during a year.

The average litter numbers three or four, but occasionally there are as many as six. Blind and naked when first born, the young do not open their eyes until they are 37 days old, at which time they weigh about a quarter-pound. At a month and a half they become active enough to venture out of the nest. At nine weeks they are fully furred and active.

The mother Gray takes good care of her young. She keeps them warm and clean, curling up around them while they nurse, and often grooming them. She feeds then nothing except her own milk. At weaning time they are active enough to come out of the nest and search for their own food.

If danger threatens, or if the nest becomes unsuitable for any reason, the mother squirrel may move her litter to another location, one by one. She carries her young in a curious manner. The young one curls around the mother's throat, with its legs around her neck. The mother grasps the young by its nape or back. If a mother squirrel has only one litter in a year, the young may stay with her all fall and winter, the family using a communal nest. But if a fall brood is expected, the mother makes a new nest for herself and leaves her first brood in possession of the old one.

Gray Squirrels have many enemies. Predatory mammals – such as the Fox, Coyote, Bobcat, Fisher, Mink, Weasel, Dog and Cat – take a heavy toll every year. Hawks, especially Cooper's and Red-tailed Hawks, and Great Horned Owls, may prey on squirrels. Tree-climbing snakes relish the young when they can get them. There are records of large Pike and Pickerel snapping up unlucky individuals in the water.

Weather and accidents can cut the population severely. As was related earlier, many squirrels are drowned while attempting to swim rivers during migration. Ice storms sometimes take a share. Thousands are killed yearly by automobiles.

Various diseases and parasites take their toll, too. The commonest is probably the bot fly, whose larvae develop as warbles under the squirrel's skin. Various types of lice, fleas, chiggers and mites may infect Grays externally. Internally they are known to carry coccidia, and round and tape worms.

But man, with his axe and gun, has probably been the Gray Squirrel's greatest enemy. It was

man who cut down the great nut forests that were the Grays' home, who has killed Grays by the millions for food and sport.

Red and Gray Squirrels are seldom found together in the same area. There are no Red Squirrels found with the many Grays in Bronx Park, though there are plenty of Chipmunks. It is generally thought that the smaller but more aggressive Reds harry their larger cousins and drive them away, although in some areas they apparently live together amicably, as on the Cornell University campus at Ithaca, New York. It is sometimes asserted that Reds will emasculate Grays, but as far as I know there is no scientific evidence to back up this belief.

Although young Grays do not reach full size or weight until they are two years old, many mate when a year old. There are records of Grays living close to fifteen years in captivity, but squirrel longevity in the wild must average much less.

In spite of their attractiveness in parks and other suitable areas, there is no question but that Grays can be a nuisance around homes. Every year we get many letters and telephone calls from distracted property owners who want information on how to get rid of squirrels in or around their homes. The only information we can give is to drive them out by physical means or repellants, or to trap the animals with box traps and release them some distance away. Once the animals are out of the building, all possible openings and entrances should be blocked, preferably with metal sheeting. Any vines or limbs close to the house make a squirrel's entrance easier, and any smell of loose edibles makes entrance more attractive to him. A liberal sprinkling of naphthalene flakes as a repellant in enclosed spaces will help to keep the squirrels out.

Squirrels often become a nuisance about bird feeders, eating all the food and driving away the birds. Wide metal collars on the upright and a suitable distance from trees will help in control.

Despite these faults, we nevertheless get many calls from persons asking how to care for Gray Squirrels as pets. Anyone thinking of such a project, should check with his local conservation department first. In many States, including New York, it is illegal to keep squirrels in captivity without a special permit. In New York the Gray Squirrel is protected, except for an open season in late fall. If squirrels are proved destructive to individual property, they may be taken at other times, provided that permission is secured from the State Department of Conservation.

Grays which are captured as adults do not make good pets, for they seldom, if ever, get over their wildness. On the other hand, those that are taken young enough may become tame and affectionate for a time, though there is the strong probability that they will revert to their wild heritage and become unmanageable as they grow older. To quote from the inimitable Rev. Bachman: "This species is a troublesome pet; it is sometimes inclined to close its teeth on the fingers of the intruder on its cage, and does not always spare even its feeder. When permitted to have the freedom of the house, it soon excites the displeasure of the notable housewife by its habit of gnawing chairs, tables, and books." [15]

Young squirrels may be reared fairly easily by feeding them whole milk from a doll's nursing bottle. They quickly learn to drink, and look very cunning, clutching the miniature bottle and sucking greedily. They may be weaned to solid food by gradually introducing them to bits of bread soaked in milk, or cooked cereal. Soon they will be eating all sorts of green vegetables, fruit, rolled oats, nuts and seeds.

The ideal cage for Grays, if they must be kept in captivity, is a large outdoor cage of half-inch mesh wire, furnished with branches for climbing and a hollow log for a nest. A wire floor raised above the ground makes for easy cleaning. If the ground is used as the floor, the posts and wire should extend at least a foot below the surface.

All in all, the Gray Squirrel has been, and is, one of the outstanding species of America's native fauna. To the early settler, he was an important game animal, furnishing easily acquired meat for the pot and soft fur for clothing.

Probably his greatest use has been his wholly unconscious planting of nuts – the acorns, beech, hickory and other nuts which he buries but fails to dig up. Bannertail is important for his aesthetic value, too. What other animal is so frisky, so entertaining, so able to brighten the hearts of young and old in a city park?

[15]Audubon and Bachman: Viviparous Quadrupeds of North America, Vol. 1, p. 271.

Are you an Echidna?

This bristly mammal is practically without charm. At the drop of a hat it goes underground and lays an egg. However, it *is* a zoological rarity.

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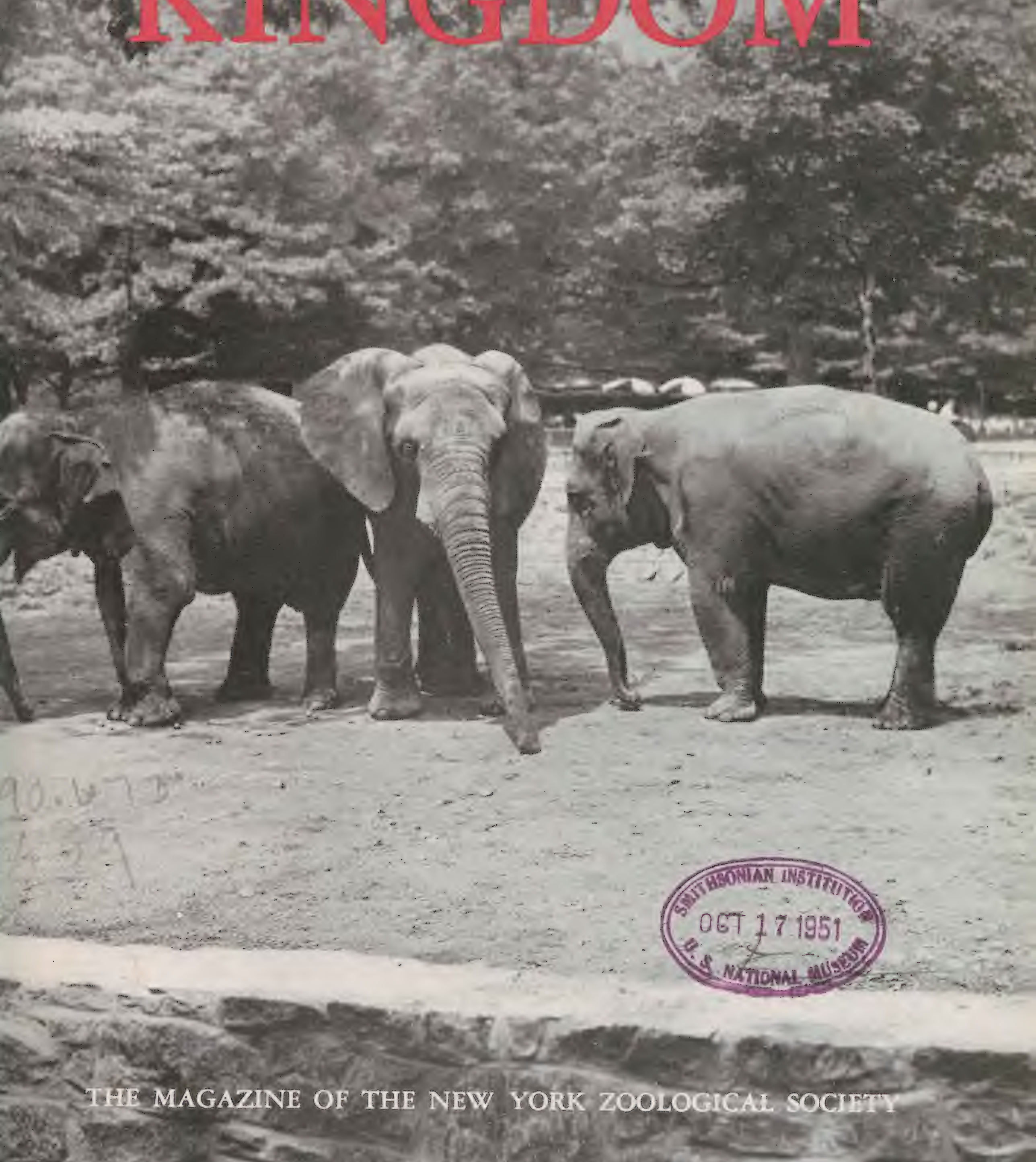
ANIMAL KINGDOM



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ANIMAL KINGDOM

Bulletin of the New York Zoological Society

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Homecoming

THE OLD SAW "There's no place like home" has its own special meaning when one returns to our Zoological Park after a journey in the far West. As anyone knows, the country beyond the Missouri is an eye-filling part of the world, and coming back East can sometimes be an anti-climax after one senses and experiences the "wide open spaces." As an antidote to a post-vacation let-down and that New York-looks-drab feeling, a visit to the Zoo is highly recommended. Just now this prescription is especially effective because of the pleasure to be derived from the recent major improvements in the Park, such as the Great Apes House and the Penguin House. There is, too, a cumulative effect of the increased attractiveness and interest of many other exhibits and the growing beauty of the Park as a whole.

If one's eyes have seen an occasional Elk or Bear, generally at some distance, the Lions and Antelopes right before one in the African Plains are a really stirring sight. In passing, the opportunity for close observation of some of the great animals of our West is making the Jackson Hole Wildlife Park the center of attraction we hoped it would be. This year visitors have come to it from every one of the 48 states, as well as from eight foreign countries.

No matter what the sights or experiences of one's wanderings, the Zoo is here to give zest to homecoming.

Fairfield Osborn

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FISHES That Look Like PLANTS

By JAMES W. ATZ

STUMPING THE EXPERTS has been a popular pastime ever since quiz shows became a staple of radio and television programs. But certain fishes have been stumping the experts for centuries – and by experts we mean fishermen and ichthyologists, who make it their business to know and catch fish. Undoubtedly other people have also been fooled by these fishes, but so completely that they never even knew they were being duped!

For a professional fish-man, an ichthylologist, to confess that he couldn't recognize a fish when he saw one may seem like a strange admission. And yet many ichthyologists have admitted being deceived into thinking what was really a fish was something entirely different. Indeed, they have been so impressed by the deception practiced upon them that they have written about it, trying to explain what they saw, or rather what they didn't see.

What these fish-men thought was a leaf, flower, stem or seed-pod turned out to be a fish instead, a fish complete with head and tail, fins and scales, in fact showing all the structures possessed by ordinary fishes, but so arranged and manipulated that they appeared like some bit of vegetation. Not only did these fishes look like plants, but they frequently acted like them!

One of the earliest observations on a fish that looks and acts like a piece of vegetation was made by Arthur Willey, a comparative anatomist and naturalist who spent several years in Ceylon. "I was walking along the reef in the company of a fisherman carrying a net when he espied a small fish, which he attempted to catch for me. I could not see what it was at first, but noticed that the man failed to bag it after several ineffectual attempts. The fish did not swim far away from the spot, but dodged about baffling its pursuer. I approached and seized the net, whereupon I saw a yellow jak [mangrove] leaf gently and inertly sinking to the bottom. This is surely no unusual sight close inshore, and I was about to turn away,

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iding in this clump of argassum weed, a Sar-assum Fish illustrates e value of its protec-ve form and coloration -it all but disappears the vegetation which its natural habitat.

A close-up view of the Sargassum Fish reveals the ragged, fleshy tabs and peculiar fins that so break up its outline that it merges perfect-ly with the seaweed in which it usually occurs.

when to my astonishment the leaf righted itself and darted away." [1]

The fish was a Seabat, a relative of the salt-water angel fishes, belonging to the genus *Platax*. Seabats inhabit coral and rocky reefs and sheltered bays from the Red Sea and east coast of Africa all the way to southern Japan and the islands of the southwestern Pacific. One Norwegian scientist who discovered some small ones swimming among the floating leaves of mangrove trees, found it "by no means easy to see which was a leaf and which was a fish. The colour of the fish varies from yellow to dark brown to suit the different shades of the leaves. Further the fish moves very gently, swimming now on the side, now erect, exactly like the leaves swaying with the gently moving water. . . . It is very interesting to see, how this resemblance with a leaf has been brought about. The greatly elongated and pointed dorsal and anal fins represent the stalk and the point of the leaf; the very short, high, compressed body, the small, inconspicuous tail, and the remarkably rounded profile, give the outline of the leaf very well, while the larger of the darker

bands across the body represents the mid-rib of the leaf. From a figure alone it would certainly not be possible to infer that this would be the habit of the fish. . . . But on seeing the fish in its natural surroundings it is unmistakable. . . . The movements of the fish outweigh completely the lack of perfectness in shape and colour, and the combined result of shape, colour and habits of the fish is a very perfect disguise as an old mangrove leaf, swaying from the movements of the water." [2] Still another ichthyologist admitted that while fishing for a Seabat he "caught the leaf in a dip net and allowed the fish, which he thought was the leaf, to escape!" [3]

Mangrove trees are found throughout the tropics along the shores of estuaries, the banks of rivers and on sheltered beaches, and their leaves litter the water's surface during certain times of the year. Nevertheless, it is remarkable that two other, quite unrelated, species of saltwater fishes have also been seen posturing among mangrove leaves. Dr. Charles M. Breder, Jr., who at that time was Director of the New York Aquarium, observed young specimens of the Leatherjacket, *Oligoplites saurus,* at the marine laboratory the Aquarium maintained for five years on the west coast of Florida. They drifted motionless "near the surface of the water, generally head-down or twisted in such a manner as to resemble a half waterlogged leaf and presented a most un-fish-like appearance." [4] Even more striking was the behavior of a young Tripletail, *Lobotes surinamensis,* which Breder studied at the Lerner Marine Laboratory on Bimini, British West Indies.

"At rest, the fish took up a position usually at or close to the surface on one side, sometimes parallel to the water surface but more frequently at a slight angle to it with the head down. The whole fish was generally bent in a slight arc with the convex side uppermost. . . . Locomotion under such conditions was effected entirely by the transparent pectoral fins. It was slow and resembled remarkably the drifting of a leaf. On occasion, the fish would reverse its sides rapidly, rolling over on its long axis in a manner not unlike a floating leaf turning over when some vagary of current upsets its equilibrium. When slightly disturbed, it would not dart off as is usual with fishes but would recede from the source of disturbance at only a slightly greater pace than when

Photo by C. M. Breder, J

The Tripletail lives in shallow marine water over most of the world. Both young and adult are usually of a mottled brownish coloration

moving for other reasons. If sufficiently disturbed, as by an attempt to catch it in a net, it confined itself to short darts of not more than 18 inches when it would immediately resume its posturing." [5] Most remarkable was the fish's apparent recognition of the mangrove leaves it so closely resembled. "When a handful of such leaves were tossed into the aquarium containing the fish it immediately moved toward them in its characteristic drifting type of locomotion and literally 'schooled' with the leaves. The performance was most impressive as they were the only objects from which a positive reaction could be elicited."

Still another fish is deceptively associated with parts of mangrove trees, but with its seed-pods instead of its leaves. On the west coast of Florida, half-inch Spadefish, *Chaetodipterus faber,* are found during July and August along clear beaches. These young, jet-black fish would stand out sharply against the light background were it not for the peculiar way they rest in very shallow water, allowing themselves to be rolled back

Photo by C. M. Breder, Jr.

When placed in an aquarium with floating mangrove leaves, this young Tripletail postured in this leaf-like but very un-fish-like manner.

deposited in the collections of the New York Aquarium, Curator-Aquarist Coates described their peculiar appearance and behavior. "The color is a monotone of dead brown; the pectoral fins and parts of the dorsal and anal fins are quite transparent. Its method of progress, on the face of it, appears very mysterious, for hanging head down in the water the fish lies at an angle for all the world like a dead leaf, and drifts about at the whim of every little current of water. The compressed form of the animal heightens the illusion, and the 'beard,' a slender tab of flesh on the chin, completes the dead leaf appearance by its simulation of a stalk. . . . However, when the fish chooses, it can move with astounding rapidity, jumping several inches from the water with little effort. An examination of the fins explains the anomaly. The pectoral fins and dorsal and anal fin-tips are quite colorless and are in constant

Photo by H. M. Hale

One of the most fantastic of plant-mimicking fishes is the Leafy Sea-dragon from off southern Australia —a foot-long creature closely resembling seaweed.

and forth by the wavelets lapping the sand. While in this position they appear almost exactly like the infertile seed-pods of the mangrove trees that fall in large numbers into the water at this season of the year, quickly turn black and, like the fish, roll in the gentle surf. The deception is further enhanced by the presence of black snails of approximately the same size. Thus, the small Spadefish avoid detection not by making themselves invisible, but by putting on the appearance of other conspicuous objects in their habitat. So well did this subterfuge work that it was not until his fifth season of work at the Aquarium's Florida laboratory that Dr. Breder became aware of the numerous young Spadefish practically at his front door, although he had caught slightly larger specimens there before.[6]

Perhaps the best known example of a fish looking like vegetation is the Leaf-fish, *Monocirrhus polyacanthus,* from the fresh waters of northern South America. When the first living specimens were brought into the United States in 1933 and

Several pipefish are hidden in this bunch of eel grass, holding their slender bodies upright and swaying as the leaves are swayed. This is the Snake Pipefish,* Entelurus aequoreus, *found in waters along the coasts of Europe.

Photo by D. P. Wilson

motion. They cause a considerable current of water to flow, but so nicely are the effects balanced that the fish can remain absolutely motionless in a small current of water; or the combined effects of the fins will drive it through the water in a swift dash. . . .

"The Leaf-fish is carnivorous, and subsists, seemingly, solely upon living fish of a suitable size. These are apparently deceived by the motionless leaf-like appearance, allowing the fish to drift, by well regulated movements of the transparent fins, to within a few inches of it, when suddenly the end of the slowly moving leaf opens —a swift dart of the same leaf, and the little fish is interred within the larger one." [7] The Aquarium usually maintains a tank in which two or three Leaf-fish hang motionless among the plants or in a corner. Characteristically they rest in an upright position, with the head lower than the tail, but occasionally they lie on one side. Visitors never seem convinced that they are alive and insist upon tapping on the glass in an effort to make them move. Because of this, it has been necessary to put an extra pane of glass in front of the aquarium in order to prevent the almost constant, and frequently fatal, annoyance of our Leaf-fish.

Faced with such natural wonders, zoologists have felt called upon to explain them. What is the function of this apparent masquerading as vegetation? How did the fishes get that way?

In general, the many tentative answers, or theories, that have been given to these difficult questions fall into three categories. One declares that the changes undergone by a certain fish, making it resemble part of a plant, were fated to occur by the inherent potentiality of its ancestors, that is, what happened to the n*th* generation was predestined from the first. This theory has never appealed to many scientists because it cannot be tested. It depends upon some mystical force or power that must be taken on faith.

The second theory attributes the appearance of the fish to the *direct* influence of the environment upon it. In some mysterious way the fish has gotten to look like a leaf, for example, by living among leaves for a very long time. The simplicity of this idea has great appeal, and a number of biologists believe in it. No good evidence for such a direct influence of the environment upon any animal has ever been presented, however. All careful experiments have given negative results, and therefore most biologists reject this, the Lamarckian theory. Incidentally, this has become part of the official policy of the U.S.S.R. and has come to be called Lysenkoism, after its principal proponent.

The third theory goes back to Charles Darwin and makes natural selection the driving force behind the transformation of a more or less ordinary-appearing fish into one that resembles vegetation.

Fishes are preyed upon by a host of creatures, including other fishes, many of which find their prey by sight. It is supposed that those individuals that looked more like the vegetation surrounding them were less likely to be caught and thus more likely to leave offspring behind them. These offspring are supposed to have inherited their parents' tendency to appear plant-like. Through generations of such progressive selection the fish gradually came to be more and more plant-like in appearance. The environment was responsible for the change, but only indirectly so. There are, of course, a great many *ifs* in the above scheme: *if* the predator actually does select its prey, *if* some individuals among the prey do deceptively resemble plants more than others, and *if* this characteristic is inherited — only then can natural selection do the job. The more biologists have studied these points, however, the more evidence they have piled up in favor of them. No one group of data has yet provided conclusive evidence, but all together they make an impressively favorable case. This is the theory supported by the great majority of biologists as to how certain fishes got to look like the parts of plants, and it applies to the whole of evolution, too.

The fantastic shapes and forms assumed by some of these fishes are incredibly complicated and seem to represent the end-result of a process that operates down to the finest detail. Take the Sargassum Fish, *Histrio gibba,* for instance. Its whole body is irregularly decorated with tabs of flesh, and its fins, especially the first few rays of the dorsal one, also serve to break up the outline of its body and make it blend into the sargassum weed that is its home. Add to its weird form the ability to alter its mottled color pattern in order to match the general tone of the particular bunch of weed in which it finds itself, and you have camouflage par excellence.

But the Leafy Sea-dragon, *Phycodurus eques,* excels even the Sargassum Fish in the extravagance of its plant-like appendages. This relative of the seahorses and pipefishes is known from only a few specimens taken off southern Australia. It is believed to inhabit moderate depths of the sea, presumably among seaweed — or why else should it be decked out so bizarrely?[8] The fish boasts more than a dozen appendages, each with a full complement of "leaves" — enough foliage to be a complete plant in itself! Several less spectacular pipefishes also resemble plants, frequently eel grass, by holding their slender bodies upright among the tape-like leaves, swaying with water

Leaf-fish floating head-downward and motionless in tanks at the Aquarium look so inanimate and leaf-like that visitors often tap on the glass to make sure that they really are alive. Their coloration matches that of a dead leaf.

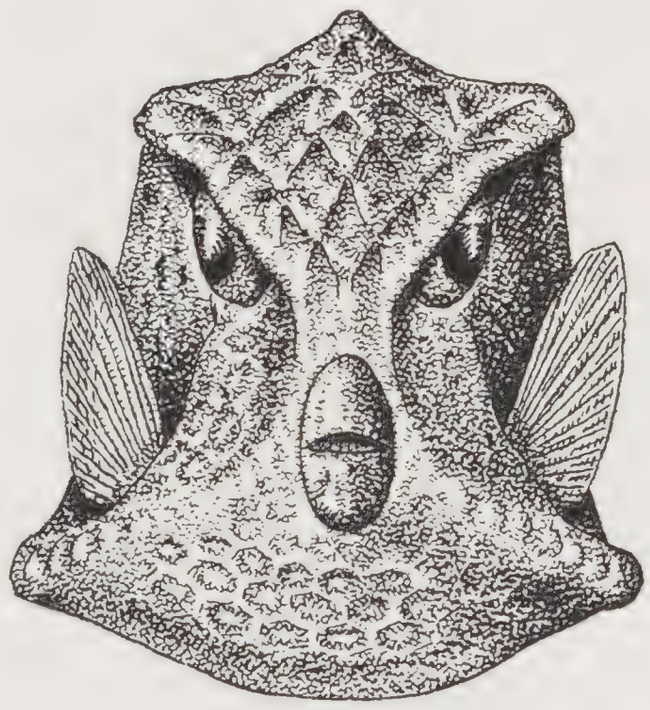
currents just as they do. Those species which have prehensile tails attach themselves to a stalk, heightening the illusion that they are growing out of the plant.[9]

An entirely different fish achieves the same effect by fastening itself down by means of its mouth. Dr. William Beebe was the first to describe this peculiar behavior. While diving among the coral jungles of Haitian reefs, he noticed a young Orange Filefish, *Alutera schoepfi,* swim into a small clump of eel grass. "He took hold of a bit of coral with his sucker mouth and immediately set both vertical fins in gentle, undulatory motion, the other fins, especially the long caudal, being furled, so that the general body shape was tapering, which, together with the mottled green color, transformed it into a seaweed frond or eel-grass blade. Now and then the fish revolved on its base without letting go. The trigger spine, slightly elevated, conveyed the impression of a bit of shredded tissue. An additional aid in the deception was the considerable variation of color in these fish, shifting from plain dark cedar green to a mottled greyish or greenish white." [10]

We have far from exhausted the list of fishes known to resemble plants or their parts. All told, more than twenty-five species have been so described and undoubtedly more remain to be discovered. We can only mention in passing the young gars that look like twigs lying on the surface of the water, the baby flying fish mistaken for a floating flower, and the wrasse, Lumpsucker and Kelp Blenny which resemble seaweed. Ichthyologists will probably never tire of writing about how they were fooled by this fish or that. It is not being duped that makes them write,
but the fresh sense of wonder that accompanies each new discovery. Dr. Myron Gordon felt it when he first ran across the young of the Trunkfish, *Lactophrys trigonus,* and mistook them for bits of floating algae, while seining in the Gulf of Mexico. "As we hauled out pieces of seaweeds of many colors and curious designs, I noticed a number of green globules of jelly-like algae, suspended in the water enclosed by the net. They moved almost imperceptibly, as if carried by the tide. As I reached down to remove these bits of plant masses, they moved a trifle faster than my open hand. I tried again, with the same empty result; then it dawned upon me that those globs of algae were not algae at all but were some form of animal life. I made a deliberate lunge at one of them and found that I had a baby trunkfish in my hand.

"My first impression of having to deal with green masses of plant life was so strong that the realization that they were representatives of the animal world came as a definite mental shock. I had the sensation for an instant of acting as a magician and at the same time of being one whom the magician held spellbound. It was almost as if I had pulled a rabbit out of the net.

"I looked at the baby trunkfish again. Its body was already hardened with bone and its small mosaic green shell was beautifully sculptured in an intricate design that followed a hexagonal pattern. Its tiny, transparent fins were hardly visible in my hand; they were entirely invisible in the water. It was these translucent fins that had enabled the little trunkfish to move away in an unfishlike manner from my hand. When I replaced it in the water, the little green fishy ball made off with the smoothness of a toy balloon in a quiet breeze." [11]



This drawing of a baby Trunkfish was made from a specimen only 5/8 of an inch long. This is the tiny juvenile that was so algae-like that Dr. Gordon did not at first recognize what it was.

Without being poetry, that is high-flown language for a scientist. But it expresses the feeling that so many of them have when, in their predictable ichthyological world, they encounter the unexpected—fishes that look like plants.

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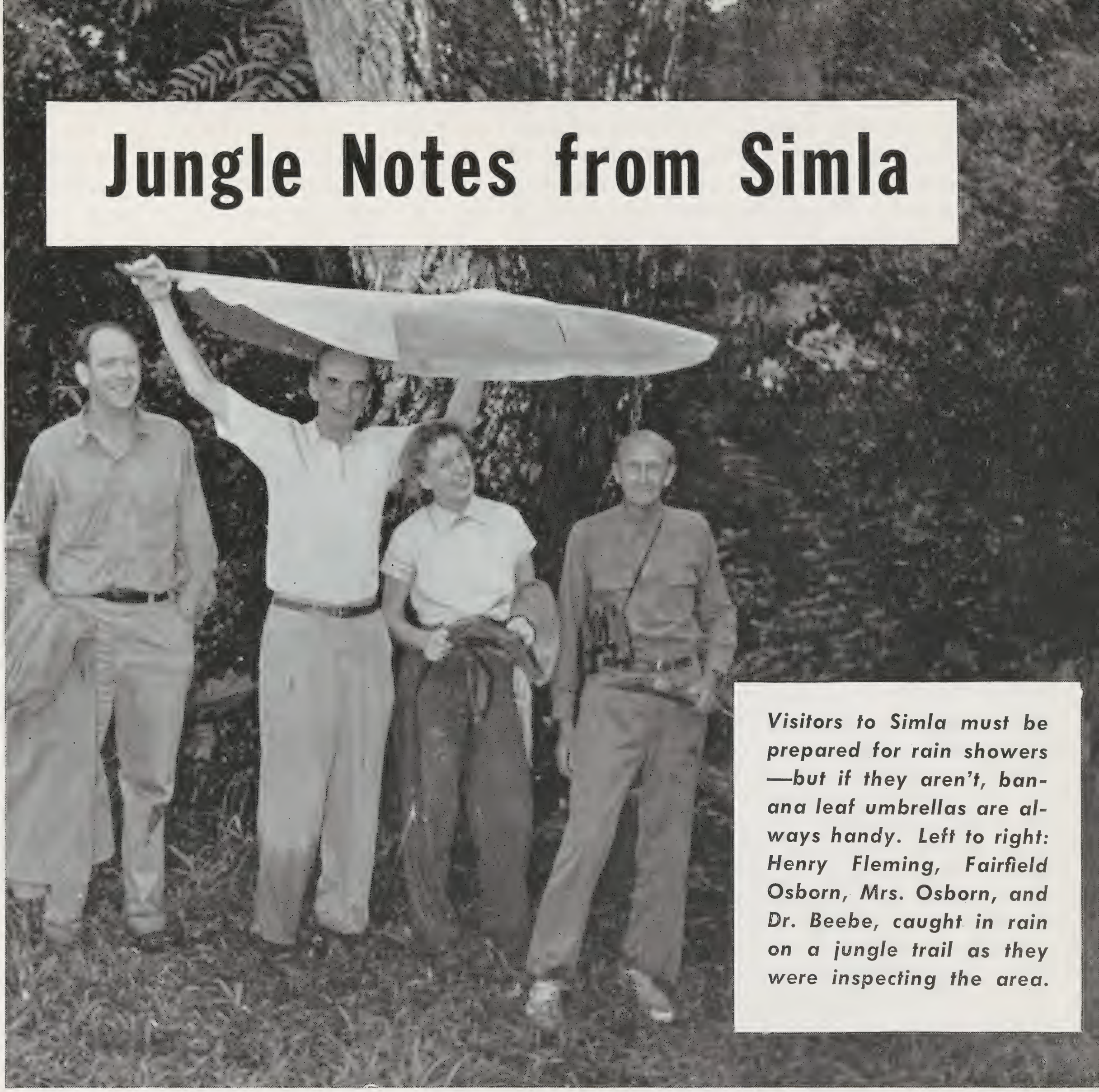
Jungle Notes from Simla



Visitors to Simla must be prepared for rain showers —but if they aren't, banana leaf umbrellas are always handy. Left to right: Henry Fleming, Fairfield Osborn, Mrs. Osborn, and Dr. Beebe, caught in rain on a jungle trail as they were inspecting the area.

By WILLIAM BEEBE

EACH YEAR *when Dr. William Beebe and the staff of the Department of Tropical Research take up residence at our tropical laboratory—most recently at Simla, in the Arima Valley of Trinidad—Dr. Beebe writes monthly reports on the station's activities. These are intended for the eyes of the trustees and staff of the Zoological Society, but they are of such general interest that we have made extracts from the five reports sent back this spring and summer. Incidentally, this sojourn at Simla was the forty-ninth expedition of the Department of Tropical Research and continues the series of field trips started by Dr. Beebe in 1900 when he made bird studies for the Zoological Society in Nova Scotia.*

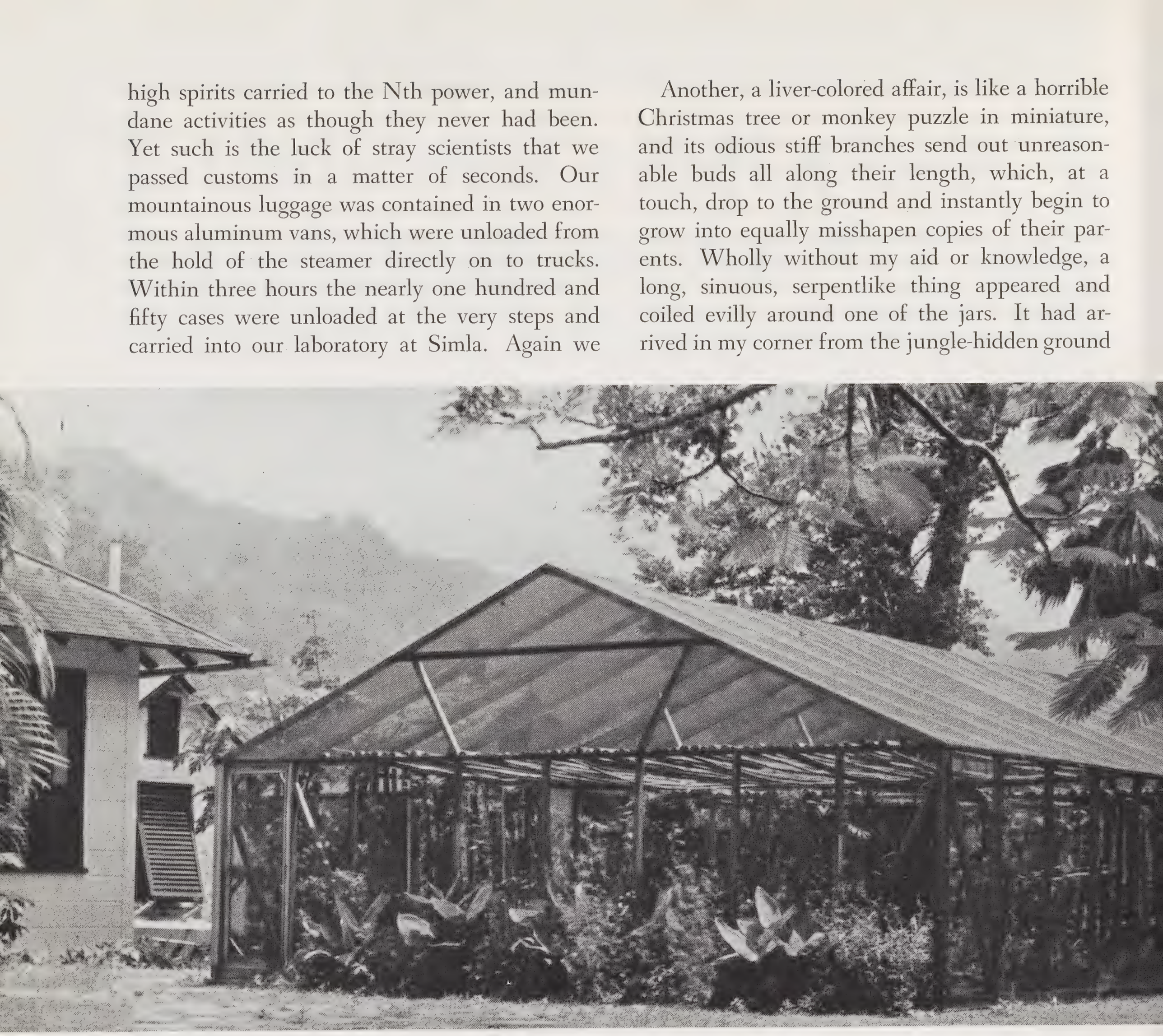
* * *

To command efficient, intelligent attention when one lands in Port-of-Spain on the first day of Carnival is comparable to a deaf-and-dumb Esquimo arriving at New York at midnight, provided only with Japanese currency. In Trinidad this date is of the essence of holiday time, with

high spirits carried to the Nth power, and mundane activities as though they never had been. Yet such is the luck of stray scientists that we passed customs in a matter of seconds. Our mountainous luggage was contained in two enormous aluminum vans, which were unloaded from the hold of the steamer directly on to trucks. Within three hours the nearly one hundred and fifty cases were unloaded at the very steps and carried into our laboratory at Simla. Again we express our gratitude to Alcoa and to the Colonial Government.

* * *

In the north-west corner of the upper terrace, in several of the great jars, I had planted last year all the weird growths I could discover. On my return, I found the corner a veritable botanical chamber of horrors. No one has yet been able to give me names for my changelings, but in complete anonymity they thrive and put forth gargoylish structures. One we call the Schmoo plant, for even in death the gray thorny stems hold aloft unpleasantly yellow fruit, with swollen body and a trio of strange stubby legs, outdoing the most bizarre of gourds.



Another, a liver-colored affair, is like a horrible Christmas tree or monkey puzzle in miniature, and its odious stiff branches send out unreasonable buds all along their length, which, at a touch, drop to the ground and instantly begin to grow into equally misshapen copies of their parents. Wholly without my aid or knowledge, a long, sinuous, serpentlike thing appeared and coiled evilly around one of the jars. It had arrived in my corner from the jungle-hidden ground far beneath the western battlements, and lay with the tip raised, like an over-fleshed, headless, green snake. Later, however, it will bloom into beauty, for it was the growing tip of a night-blooming cereus of undeterminable length. My plant horrors will yield interesting data as to their methods of fertilization. Judged by externals, they should feel at home in the infamous spook house of Charles Adams. It was a relief to turn to the cheerful, wholesome faces of zinnias and marigolds looking up from the turf at my feet.

* * *

It is unnecessary to search always for rare animals of the tropics. Any moment a well known

bird or other creature may reveal an unexpected trait.

Simla has its own pair of Glossy Cowbirds, which walk about together in one or another of the compounds. This monogamy reflects the time when they were not parasitic, before they began to lay their eggs in the nests of other birds. Day after day this pair attracted our attention because, for some unknown reason, in sun or rain, they bathe in our bird pool. We have twice seen

The new Insectary is in operation now, and is already lush with blossoms of many kinds—tempting food in a variety of colors for the insects that are kept for study by new methods.

the female inside the laboratory, casting what we chose to interpret as anticipatory glances at the Wren's nest in the rafters. These poor little Godbirds, as the natives call them, are the most frequent victims of the cowbirds. This in spite of the fact that a Wren is only a little more than half as large as a cowbird, and the eggs are in the same proportion. Indiscriminate mother love surely makes life hard for the Wren.

While writing this report I happened to look out of the window and saw a bird carrying a long shred of grass. This was not unusual, for this is the nesting season of many species. But what awakened and held our keenest interest was that this was the male cowbird. Last year I made an identical observation. So here we have two instances of a flash-in-the-pan, long suppressed instinct — a momentary, futile harking-back to the time when cowbirds, like Grackles, still built their own nests. Naturally, we watched the birds closely during succeeding days, but also, as we expected, we saw no further indication of a reincarnated nidicolous instinct.

* * *

Henry Fleming snatched one March day from construction for a preliminary visit to one of the Aripo caves. Two local men went with him, as well as Jack Cody and Ellen Ordway. This cave is five miles east of Simla as the crow flies but four times as far by car and foot. It is in the second valley to the east, and its yawning mouth, with an inrushing stream, is situated well up on the slope of Mount Aripo, at an altitude of twenty-four hundred feet. The trip was a quick one with only three hours for cave exploration, but Henry was able to penetrate three-quarters of a mile. En route it was necessary to descend, with a rope ladder, two steep drops of thirty and fifty feet.

An estimated two hundred Guacharos or oil birds were found, screeching as usual in their maniacal way. Six nestlings were detected in the lofty-placed nests. Besides these were multitudes of bats of several species. Crickets with immensely long antennae were collected and a land crab was taken a half mile in. On the way out, to dark adapted eyes, the moss and lichen-covered walls appeared to glow with a strange, luminous green refulgence.

* * *

The first spell of dry weather has started animals of many kinds in search of water, and this seems especially true of serpents. We have seen or captured four Rainbow Boas, an equal number of Bushmasters and Ferdelance, besides two Tree Boas and five Boa Constrictors. All the boas were liberated and the poisonous species by-passed or killed. The species of Arima Valley snakes has been increased to fifty-five per cent. of the entire Trinidad ophidian fauna, while recorded lizards in the same area have now reached sixty-eight per cent. Even the lesser jungle creatures are shifting in the dry air. In full sun and daylight we found a magnificent Peripatus, measuring full five

inches in length, and the possessor of forty-two instead of the more usual twenty-eight pairs of legs.

* * *

As regards our wild house-birds, the Wren is rearing still another brood in the rafters. Difficulties dog her efforts, for our tame cowbird has at last gone into action and made two visits to the nest. The first time she threw out an egg of the rightful owner and on the second occasion there was hurled to the floor a pitiful, still living, three-day-old, naked baby Wren. Wholly unexplained is the ferocity shown by both parents at the approach of a Palm Tanager and the complete disregard of the more-to-be-feared avian parasite.

* * *

The new Insectary is already lush with sprouting and blossoming bromeliads, orchids, passion vines and moon flowers. The false roof, orchid-house-like, is of split bamboo with equal open and closed interspaces. We have found as many uses for this giant grass as the Swiss Family Robinsons, but most unexpected was practically a demonstration of its efficiency as a guillotine. A sheaf of split bamboos started to slide down the roof. I happened to be standing in their path but just before they reached the level of my neck they fortunately parted and swept past with only inches to spare on each side of my head. Later on, one of the men cut his finger to the bone with one of the razor-sharp edges. I cannot imagine a more unpleasant demise than decapitation from sliding bamboo splinters. The first giant Caligo Owl Butterfly has found his own bit of overripe banana and seems at home. We hope he will be the forerunner of broods which will yield interesting facts in the course of caligo spans of life on the earth.

* * *

The unusual activity of several species of poisonous snakes continues, whether or not induced by a very early mating season. Corals occasionally cross our trails in full daylight, six

Azteca ants live on the trunk of the tall cecropia tree and they were able to repulse the most valiant efforts to climb it.

One of the early inhabitants of the insectary was a Bamboo Leaf Butterfly which was happy with a bit of banana.

Ferdelance have been seen or captured, and losses of stock animals have begun in our valley. Our friends the Wrights had a bull and a valuable cow killed the same night by the bite of Bushmasters and not far away a pig died from the attack of a Ferdelance. Vampires have increased and visit our bedrooms, flying about our nets.

* * *

Intimate contact with jungles in various parts of the world over a period of four decades breeds a certain familiarity but never contempt or boredom. As time goes on, fear lessens and disappears but respect increases. One learns that around a five-foot, coiled Ferdelance is a two-foot hemisphere of aerial deadline; experience brings assurance of the inoffensiveness of a herd of Peccary—until one is wounded or the young threatened. However, the harmless conceit engendered by knowledge develops aspects of imagined human superiority.

Witness: On May eighth I looked into the upper branches of a top-knot tree and saw a nest. I climbed and found the thrushes' ball of moss deserted. I broke off several dead limbs and prepared to descend. My downward line of progress was now, however, covered with a living mass of ants; a horrid mobile bark concealing the real covering of the tree. They were tiny, but double-enders—jaws in front and a sting aft. Even as I looked, the vanguard reached me and went into action. I had to decide between an eight foot drop or an exceedingly unpleasant climb through living hordes infinitely worse than any vegetable nettles. I dropped. Forty-seven years had left considerable gaps in my jungle lore.

Two days later my colored bird and insect collector offered to climb a tall cecropia and bring down some of the six-inch giant caterpillars which were defoliating the uppermost leaves. He knew as well as I did about the formidable Azteca ants which occupy apartments in the segments of the trunk, but his skin was tough and his spirits high. He tied bands of fluffy cotton around wrists and ankles and started up. Ten feet aloft and he grunted; five feet more and he mumbled emphatic words, prayers or otherwise, to himself. Another yard and he grinned ruefully down at us and gave himself to gravity. It was more than flesh could stand. The Aztecas had won.

A week later I was crouched in a trail by a

huge boulder from the base of which an Antbird had flown. For five minutes I did not move, awaiting the return of the bird. Suddenly every muscle I could bring to bear came into play and my speed for several yards should have won me a place on any Olympic team. Without my knowledge a fan of army ants had encircled me, climbed in hundreds as far as my waist and, as if at some concerted signal, attacked. I went home with my clothing and considerable of myself adorned with the bodyless jaws of these efficient insects. It is easy to scrape off the ants but their jaws and heads remain and require special technique.

* * *

An outstanding example of the extraordinary differences in psychological traits which may exist in closely related animals came to us in May. We had in captivity all three of the Trinidadian genera of opossums, or Manicous as they are called here. Didelphis, the largest, recalls our northern marsupial in general appearance and disposition. We found it one of the most revolting and uninteresting of mammals; snarling, stupid, cowardly, dirty and odoriferous. When thoroughly frightened it feigned death, and it had the unpleasant habit of devouring its offspring. It resisted actual death as resolutely as it appeared irreconcilable to a happy life, and the easiest way to get rid of it was to set it at liberty to continue its unsavory existence.

The medium sized and more attractive Philander was of a wholly different mental complexion. It was alert, active, nervous, tense, ready to bite, and poised to take instant advantage of any opportunity of escape.

One day a diminutive East Indian boy appeared at the steps of Simla laboratory with a black and dead cocoa pod. We indicated in no uncertain terms that our desire for a decayed cocoa pod could not be expressed in low enough terms either in English or in Hindustani. The infant pointed to a small hole in the husk, and through it we caught a glimpse of fur. On the other side was a larger opening, but still only one inch by one. I shook the pod. The fur moved and a small face appeared, sleepy and protesting. Thus did Baby Snooks, alias Marmosa, alias Mouse Opossum enter our life and hearts.

A Katydid was presented, and the film passed from the amber eyes, and sharp little teeth closed on the green insect. A pair of infantile, pink hands came into view, each seized a wing of the unfortunate orthopter, and the Katydid shuttled back and forth, as one would eat an ear of corn. The multitude of engaging traits and further adventures of the Mouse Opossum will be narrated elsewhere. Here I can only praise his every quality; cleanliness, tameness, gentleness, complete adaptation to a strange environment, confidence in us as providers of satisfying moths and bananas, a drink of fresh water, and freedom to emerge from one's cocoa cocoon, and to re-enter at will. Psychologically he seems to have evolved in a distinct phylum from that of his larger marsupial relations. In immediate acceptance of captivity, as I have written elsewhere, and in intimate fearless association with such unimaginable monsters as American zoologists, Marmosa is worthy of special classification, of membership in that small and select coterie of creatures which

During the first spell of dry weather a magnificent specimen of Peripatus, fully five inches long, was found on the trail.

"Baby Snooks," otherwise known as a Mouse Opossum, came to the laboratory in a neat little cocoa pod apartment.

includes Mallard Ducks, Red Junglefowl, Rock-doves, Trumpeters, polychrome lizards and mantids.

* * *

The work on the function of color in the lives of insects is largely dependent on our two insect houses. They provide fresh specimens for the spectral analyses, through photographic filters, of butterfly colors, from ultraviolet through the visible to the near infrared. In connection with this work we are experimenting to determine the limits, in the ultraviolet and red ends of the spectrum, of the vision of the species with which we are working, since this is thought to vary considerably from one group to another. Fortunately for curious zoologists, butterflies, like moths, are usually attracted to any light which is visible to them. Therefore, a very simple contraption is serving us well. A large wooden box has been fitted with frames for interchangeable colored windows and with light-tight openings for observation and manipulation. With our eye glued to the peep-hole, we can readily watch a butterfly flutter stubbornly against a six-inch square of Corning glass, which transmits light of only a narrow colored band.

Our work with the red end of the spectrum is in full swing. We have already found that butterflies, including those with bright red markings, can see orange-red light quite easily, being apparently more sensitive to it than are honeybees. Hitherto it has been assumed either that butterflies, like bees, were nearly blind to red, or that only a few could see red flowers clearly enough to visit them. But these vision tests, in conjunction with our spectral analyses, have given us two possibly related facts. First, every single one of even the purest local "reds"—whether on a butterfly's wing or a flower-petal—includes nearly equal amounts of orange-red and true red. Second, the tested butterflies are all amply able to perceive this orange-red light.

The ultimate part of our problem is to find out if this special visual capacity and the composition of their colors play active parts in the life of the insect: whether, in fact, they form one of those beautiful examples of adaptive evolution which a fortunate investigator now and then turns up. We want very much to know, for example, if any of these scarlet patches on our butterflies' wings serve as signals in their social life—for homing, mating, or fighting rival males. At present we are busily changing the patches, by harmless stains and paints. If we are patient and lucky, we may eventually learn the meanings of the colors which make tropical butterflies, to human eyes, the gayest of living things.

LUCKY B

Wild-caught or born in the
learn that visitors find an

Photogra
SAM DU

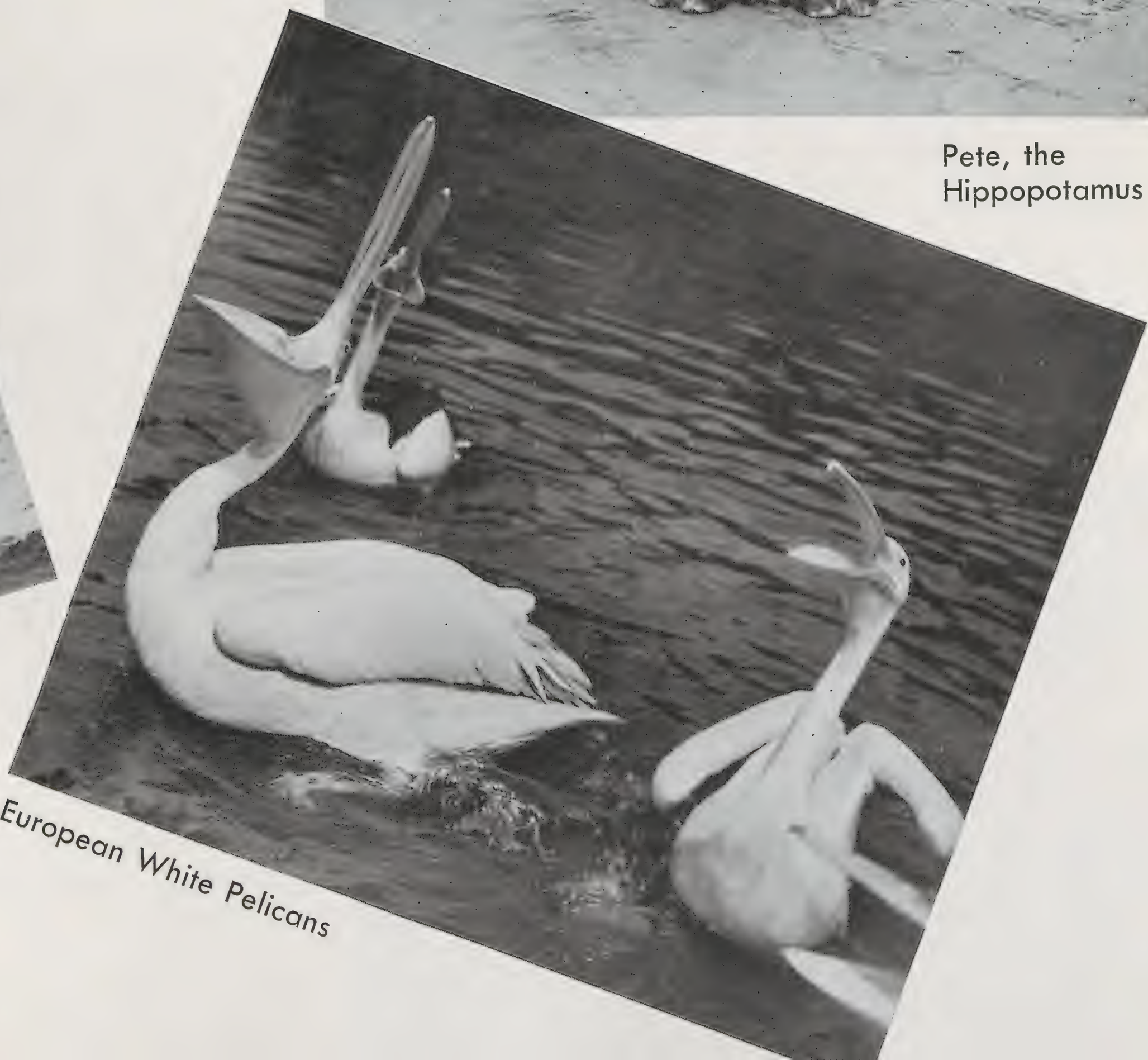
Jo-Jo, the
Kadiak Bear

Sudana and Two Asiatic Friends

GGARS!

host animals soon
mouth irresistible.

Pete, the
Hippopotamus



European White Pelicans

THE STORY BEHIND

& G

As Told in a Letter from
MRS. FRANK ZUKOSKI

In the routine of the Zoological Park, the General Curator's office each week compiles a report on the animal accessions of the past seven days. Brevity and objectiveness could scarcely be carried further, for this is a "working" record and its only aim is to provide current information for the staff. How dry, for instance, is this entry –

July 27 – 3 Arabian Gazelles
Gift of Dr. Frank J. Zukoski
Beirut, Lebanon

But how warmly human the story behind that mere book-keeping entry!

No less than human beings, every animal has a story; the difference is that while we sometimes hear too much of our friends' adventures, we seldom learn the slightest detail of the experiences peculiar to any particular animal. Animals purchased from a wild animal dealer ordinarily come to the Zoo without a history. They were captured –somehow, by somebody–and they were shipped by air, by sea or by freight: here they are, to be examined, accessioned and finally exhibited under a general label that distils only the general experience of the species.

Now and then, it's different. We know quite a lot about the history of certain animals brought back by the Zoological Society's own collector, and private donors usually supply more or less full accounts of the animals that have been in their possession. We like to hear these stories, for often they give clues to special food requirements, or special treatment. As an example, last year a young Skunk was presented to us and the donor casually mentioned that it would eat nothing but potato salad. Skunks are notoriously omnivorous and the idea of a potato-salad-or-nothing Skunk seemed preposterous, but it was a literal fact and it was only after humoring this idiosyncracy for a meal or two and then gradually adding other foods and reducing the proportion of salad that we weaned the animal to a more standard diet. If the former owner had forgotten to mention his pet's dietary peculiarity, it might well have starved to death before we hit upon the one item that would tempt it.

But the "story behind the animal," whether it clarifies our practical problems or not, is always welcome because it endows the animal with a

kind of personality, and Zoo curators and keepers, however professional and equitable their attitude toward the collection as a whole, are human enough to enjoy a special interest in animals whose background they know.

Few animals have come to us as warmly recommended as "Bambi," "Brownie" and "Baby," the three young Arabian Gazelles presented by Dr. Zukoski. On the same plane that brought them to New York from Lebanon came an airmail letter from Mrs. Zukoski from which we give extracts below. Her affection for these delicate and gentle creatures is implicit in every line, and there is no doubt that they have a reciprocal liking for human companionship. We have, indeed, had to cover the front of their compartment in the Kangaroo House with close-mesh wire to prevent possible injury as they extended heads and forelegs to be petted by the public.

Bambi, Brownie and Baby are the second trio of Arabian Gazelles (*Gazella gazella arabica*) presented to us by Dr. and Mrs. Zukoski. The loss of the first three, after about five months of exhibition, illustrates one of the problems involved in maintaining a collection of animals from all over the world and, incidentally, contributed its own valuable bit to the growing body of knowledge of animal nutrition. The young Gazelles came to us apparently healthy, with normal appetites for the choice hay, grains, vegetables and greenstuffs that we provided. They should have thrived, but unexpectedly they died. The autopsy revealed a fatal deficiency of calcium.

But why? Other Gazelles and antelopes from various parts of Africa live perfectly well on that same diet and show no signs of calcium deficiency. Correspondence between our Veterinarian and Dr. Zukoski finally brought the probable answer: the calcium content of Lebanese plants on which the Gazelles feed is extremely high. Our diet apparently did not supply the minerals to which the Arabian Gazelle is adjusted.

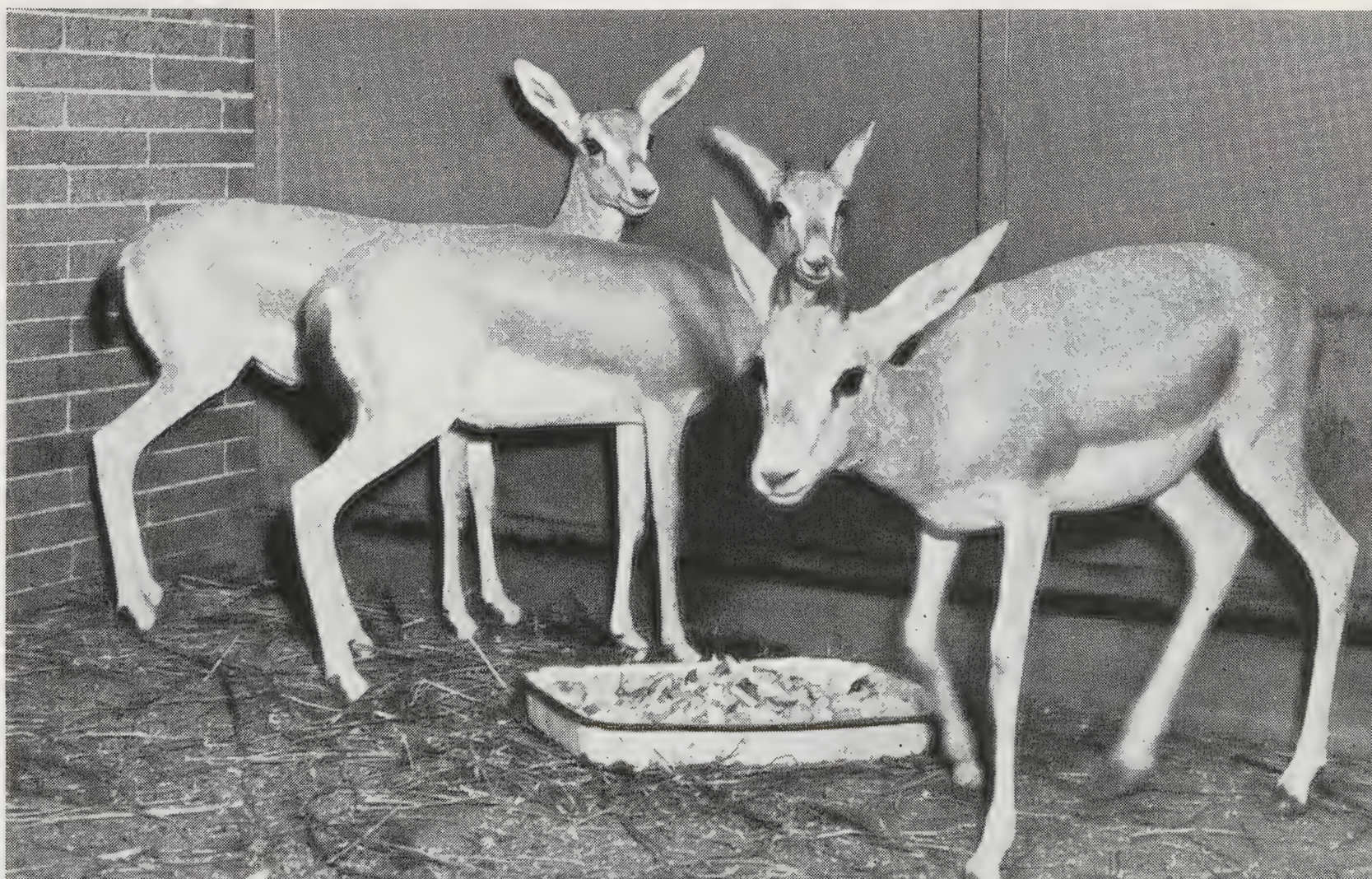
We think we know the solution: Bambi, Brownie and Baby are getting a supplementary ration of bone meal and codliver oil, and they give every indication of being well and fully nourished.

* * *

In her letter to Dr. Goss, accompanying the young Gazelles, Mrs. Zukoski explained that the trio arrived in Beirut from Saudi Arabia, by plane, on April 26, and then she continued.

"They arrived and were delivered to the apartment in an orange crate that had three little stalls. All three were lying down; two fully alert, with eyes as big as large ripe olives, looking right at you and trying to say, 'Hope you will love us just the same' . . . the third little one sound asleep.

"Doctor and I immediately prepared some nourishment for their little stomachs. They all took to the bottle and nipple. Little ten-day-old Gazelles, held in one's arms and fed milk with a bottle and nipple, can be just as great a thrill as a mother with her child. From that hour on they were my children. They were allowed to walk around the veranda in the sunshine, and become acquainted both with their new surroundings and their keeper. When at sundown the air became considerably colder, we put them to sleep in Doctor's study, in one corner, where four burlap bags were to render them some softness for the night. The alarm was set for their future feeding in three hours, lights were put out and night fell upon their first sleep in Beirut. Three hours later as



Although the young Gazelles are much the same size, and to the unpractised eye look very much alike, the horns distinguish them. Bambi's are long, Brownie's short, Baby's are still almost non-existent.

I went in to feed them, I put the light on and all three were close together, looking at me with that directness and alertness that only Gazelles possess. They were hungry, as was evidenced by the rapidity with which they ate. During the day they were kept in their pen on the veranda and each night for a full week they were brought indoors to sleep.

"Their pen, approximately 5 by 20 feet, was on one end of the veranda, and the only access to it was through the window leading from the foyer. One side of the pen was an iron fence, four and a half feet high. This was covered in its entirety with *hasiray,* which is the Arabic word for straw mats that are made in Egypt. The *hasiray* were tied onto the fence from the outside with wire. During the time they were with us, one section of the *hasiray* had to be replaced simply because they ate it. They would nibble at the mat until it came loose and many a time one would be busy trying to loosen it and chew it off, while the other would just wait, and finally, when the piece was unattached, the waiting Gazelle would go for it. I often thought they would bite each other's tongue in their attempts to get the piece of straw away from each other. This was their second game I had observed. More were to follow as days went by. Oh, yes, the first game was introduced by Bambi, the male, at the age of eleven days, titled . . . 'Amour.' We certainly were surprised.

"Bambi, Brownie, and Baby began their second week looking well fed, contented and demanding more attention. The nightly feedings were discontinued, so their last milk feeding was always a few minutes before we retired for the night. The first feeding of the day was about 6 A.M.

"The following procedure prevailed for the entire two and a half months they were in my care. Once the milk was prepared to the correct temperature I donned my boots, climbed the step ladder, and through the window I jumped into their pen, holding on to the bottles of milk. All three Gazelles became oblivious of each other and fought for those bottles. Once they had snatched the nipple into their mouths, you could move over the entire pen and they would be right there at the end of the nipple. A very interesting phenomenon of their eating was the very rapid wagging of their upright tails, and the slower but still rhythmical lifting of the right hind leg. This was enjoyed by all our visitors, both young and old.

"Brownie and Bambi never stopped for a breather, but would drink continuously until they finished the bottle, or as much as they wanted, and only then let the nipple go. Baby, however, did stop once or twice, but just to catch her breath, and continued feeding. Brownie was very grateful for the milk she consumed, because after each feeding (every two hours) she would thank me in her contralto voice, with lips held tightly together, milk foam still on her chin. You would hear that – 'Mmmmmmmm.' How fascinated were the children visitors at each feeding time! They particularly enjoyed seeing the Gazelles actually lift their little chins and stand for me to wipe off the milk foam. At that same time all three would line up around me, as I was seated on a little stool, and wait to be petted. This they begged for practically every time I got into the pen – every two hours. I did attempt feeding milk every three hours after I gave them *Shyear,* the Arabic for oats, and *Derra Abyad,* (meaning white corn, but to us Americans it looks like barley). Also carrots and carrot tops, and mulberry leaves which I dried on the back veranda. But regardless, they still asked for their milk. If I failed to watch the time, Brownie would remind me every two hours with her 'Nowwwwwww.' I

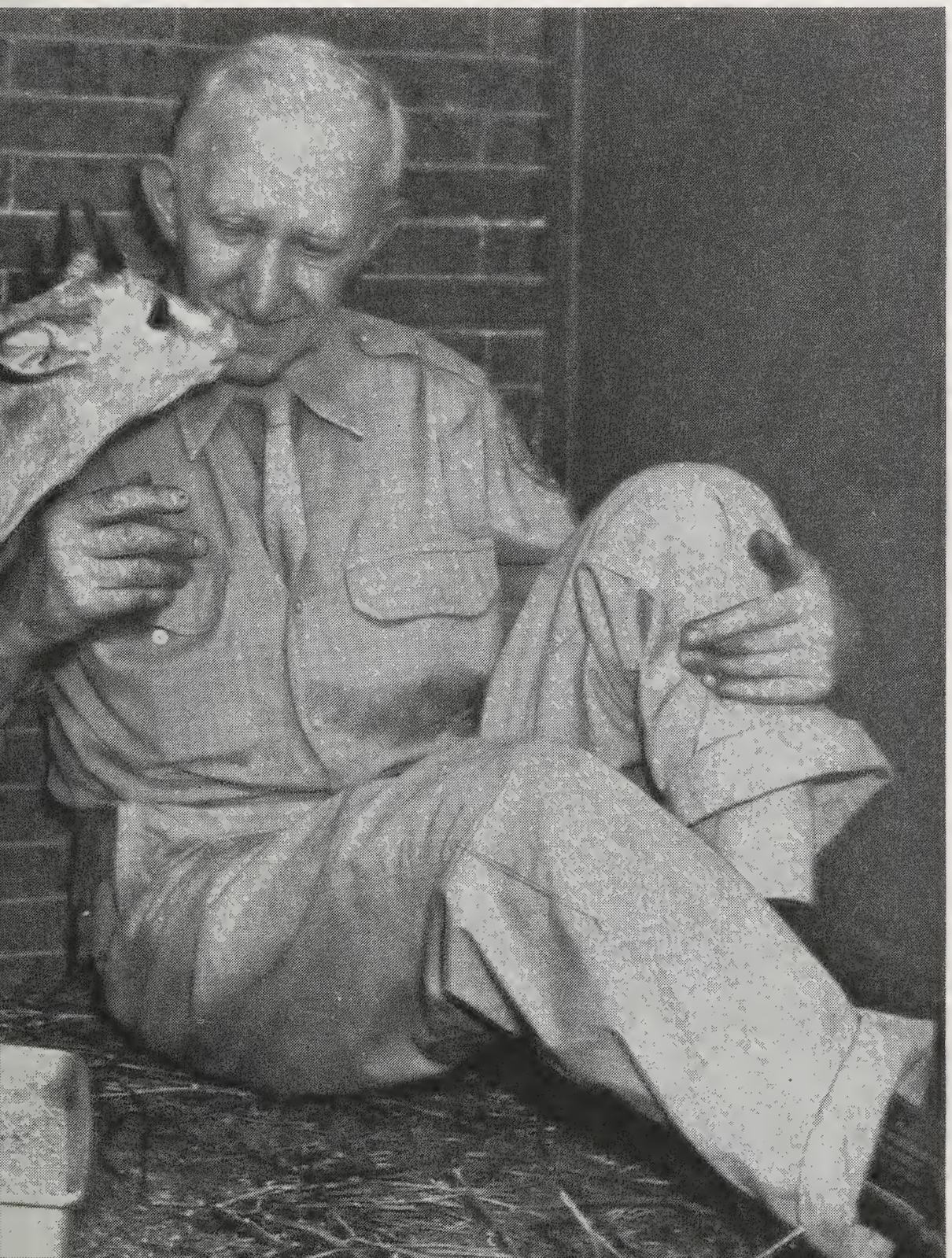
tried weaning them during the sixth week they were here, but they called for it and one couldn't refuse it, under such circumstances.

"The daily care of their pen was an ordeal in itself. The fact that my adopted babies were sharing part of our home, made it essential to give them the utmost in cleanliness. A young Arab boy was hired, and his sole job was to throw the wet sand over the iron fence, into the sun, to dry. After the sand was dry, it was thrown back into the pen. One thing in particular I noticed, that every time one of the Gazelles lay down, the first thing it did was to dig into the sand with its front leg, about four or six strokes, and when a groove was made, only then would it lie down. I feel that sand, since the desert is only sand, may be considered an important factor for their rest. When the initial bags of Mediterranean beach sand were delivered and spilled into their pen, all three Gazelles dug in with their little snouts and picked out what appeared to be tiny particles of shells. I got repeated deliveries of sand, until it was approximately five inches in depth in the pen.

"Animals respond to conversation just as do children. They seem to feel security when they hear the same voice repeatedly. My Babies understood me without a doubt. I would ask, 'Brownie, do you want to eat now?' and without fail you would hear 'Nowwwwwww.' Many a morning, from our bedroom window, which was on the other end of our veranda, I would tell Doctor to listen, (since there had been no sign of the awakening of the Gazelles), and the moment I put my head against the screen (they could not see me) and say, 'Brownie, do you want your milk now?' there was always an answering 'Nowwww.' As they became attached to my presence and voice, they would call for me with that same 'Nowwwwwww' until I made my appearance on the veranda, and then they would cease calling. Brownie did most of the calling.

"One day a little American boy came to visit us. He sat on the chaise lounge close to the wired fence of the Gazelles' pen and very quietly observed each move. Finally, after ten minutes or so, he looked at me and rather disappointedly remarked, 'They're not calling you.' Other American children told him that they did, so he came purposely one morning and waited. I had to explain that they wouldn't call because I was on the veranda and they could see me. So we commenced the game. Jimmy sat close to the pen and I went into the house. After a few minutes, I heard Brownie's 'Nowwwwwww' and little Jimmy was beside himself, running into the house and shouting, 'They are calling you, come quick.' I felt so elated because my Babies did not fail me, and because the child was simply overwhelmed by his experience.

"On several occasions when the Gazelles became a little restless due to some unfamiliar loud noise, or the time they saw a pigeon fly onto the fence, their pacing back and forth would not cease until I came out and spoke to them. I recall so well the incident that occurred with my first trio. Doctor was down in Ras El Misha'ab, Saudi Arabia, for five months, and the Gazelles and I were left alone in Beirut. The only other living soul in the apartment at the time was the maid. The rainy season began so much earlier last fall than the previous one. One Friday morning the rains came during the first week of September (most unusual, said the Lebanese) and all my



All three of the Gazelles are perfectly at home in the Zoo, but Bambi, the male, is particularly attached to Keeper Rimmer. The affection is mutual, and the keeper finds time to indulge it.

nice, clean, dry sand was changed to mud. This was the first rain the Gazelles ever saw or felt. I immediately grabbed three bath towels and several safety pins and donned my boots. I got into the pen and wrapped a towel around each Gazelle. They didn't like the towels but I kept after them and though the towels would slip off some, I would adjust them here and there and after a while they got used to them. Bambi kept pulling off Baby's towel, and vice-versa, then in about twenty minutes a rainbow was visible, followed by a most glorious, sunny day. I wiped off the Gazelles and then commenced the job of doing away with the mud. The concierge was hired to take it down in the elevator by boxfulls and dry sand was delivered. A week later the sky broke loose again, a Saturday morning in the last week of September. It drizzled all day, and at night the winds came from the west. The Mediterranean is just half a mile from us, and the winds really are frightening at night, especially when one is alone. What little I could save of the dry sand during the day, I placed in the corner up against the window, with burlap bags fastened to the iron fence and the wire fence, then a beach blanket for a roof, with more burlap bags on top, and a sheet pinned onto the top of the blanket, which I allowed to drop over the side, thus converting a portion of the pen into a miniature tent. What a tent! The Gazelles were in their towels again, but seemed very restless, pacing back and forth, grunting, and not unless I got in the pen would they stop. After some time I left the pen and did try to fall asleep several times, but with no success. I could hear them grunting and pacing back and forth. So finally, I put on my jeans and boots, and a jacket, and got in the pen with them. It was about 11:00 P.M. when I made myself as comfortable as I could, sitting in the corner, with the Gazelles close to me, on dry burlap bags. We listened to the howling winds and heard the drizzling rain as it fell upon the tile floor of the veranda. All four of us must have fallen asleep, because it was daybreak when the huge waves from the sea awakened me . . . it was 6:00 A.M., and my little Gazelles were there beside me, looking right up at me with those large, beautiful eyes. A memorable awakening!

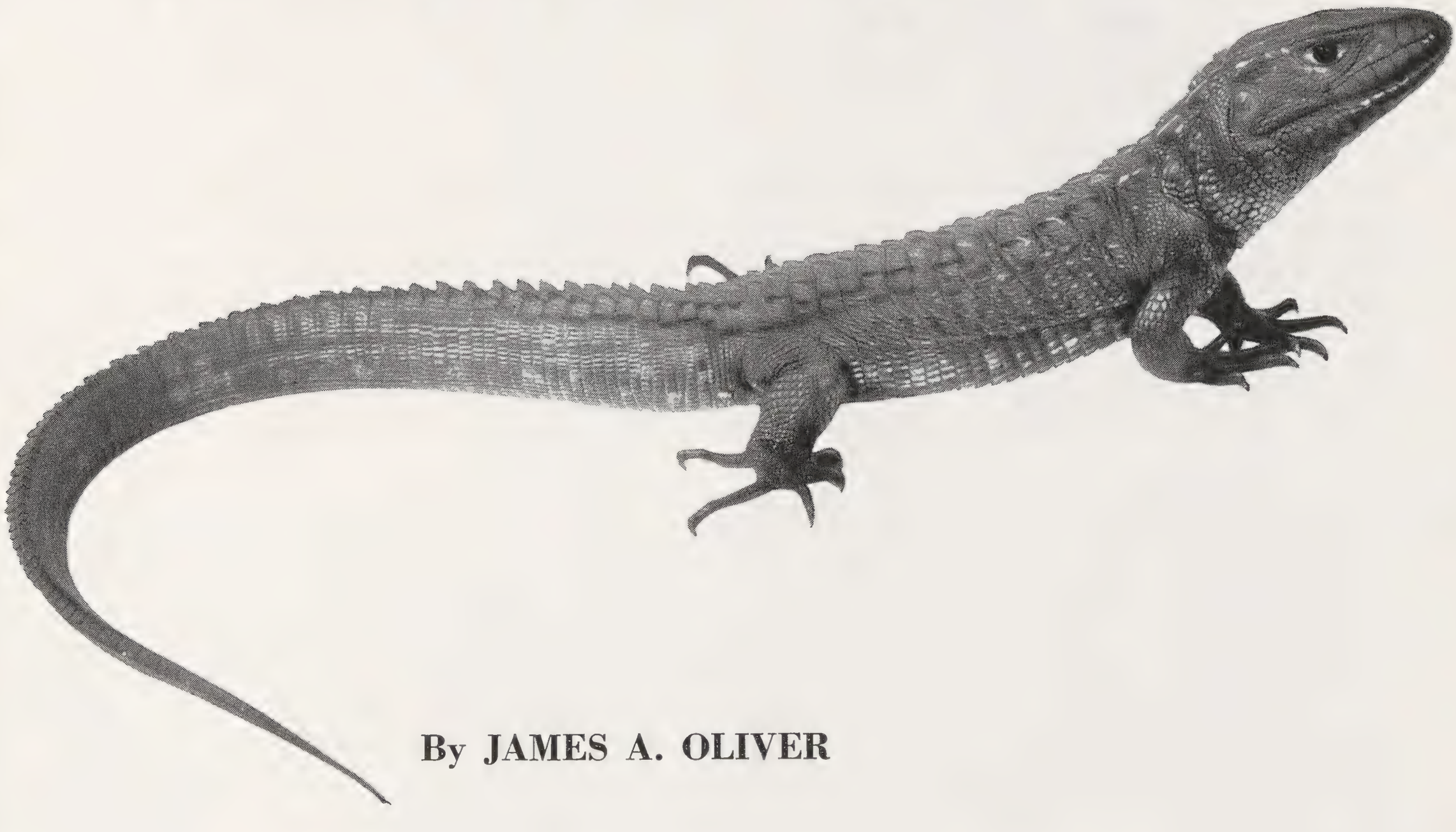
"The Gazelle being a desert animal certainly loves the sun. Their pen here on the veranda didn't get the sun until about 9:00 A.M. Each morning I noticed that they slept in the corner underneath the window. The wall on the opposite side would get the sun first. As it shone upon the wall, the Gazelles would go to that end. Several times during their first weeks here, I noticed Brownie, sometimes Bambi with her, and at times all three Gazelles, standing as if at attention, with heads straight up. It did not register in my mind immediately until I noticed the same position a few times. They were sun bathing. Once the sun hit the sand they would be in it, all three of them, just as close together as they possibly could get to each other. And as the sun moved upward in their pen, they moved with it. All day, if they were not up on their legs walking or jumping or pacing in the pen, they always slept, sprawled out, or rested in the sun. They simply love the sun.

"The last game we played together was with Bambi. He was a big boy now, and his horns were growing nicely. He loved to play by butting me in the leg with his little horns. Upon being pushed away, he would come right back at me somewhat like a little goat. This would go on indefinitely, as long as I was there at the other end. Is it any wonder that animals of the desert, as these were, can be trained as the most wonderful, most alert of pets? Time and patience and love will without a doubt prove a great success.

"The day of their departure for the United States, the truck arrived at 6:30 A.M. and with it their crate. Since it was quite large, we decided to carry the Gazelles individually, in our arms, down from our sixth floor apartment, and then put them in the crate. I climbed into the pen and handed Brownie over to Doctor. He then placed her in the elevator and closed the door with the boy guarding it. Then Baby joined Brownie. Doctor and I and the Gazelles then rode down to the street floor. All this time I carried on a conversation with them because they seemed slightly surprised and restless. The sound of my voice appeared to allay their suspicions, anxiety and fear of this change of environment. We carried them out into their crate that was to serve as their home until they arrived in the States. All this time Bambi was left alone in the pen. I wondered at the time, if only animals could tell you their

(*Continued on Page* 160)

Caiman Lizard—a Reptile Rarity



By JAMES A. OLIVER

When Pan American Airways pilot Edwin Sippel flew into New York on September 3 from South America, he brought with him one of the most interesting and little known reptiles of the Western Hemisphere. Mr. Sippel arrived at the Zoological Park with his animal cargo, including a fifteen-foot Anaconda, a beautiful, green, six-foot Imperial Boa and a peculiar-looking lizard in a crate bearing the label "Alligator." Generally speaking, the snakes would have aroused our interest more than most lizards. But not so with Pilot Sippel's lizard – for it was the first Caiman Lizard to arrive at the Zoological Park in a quarter of a century!

This seldom-seen lizard is an inhabitant of the tidal marshlands of the Guianas and the lower Amazon valley. It appears to be equally at home on the land or in the water. Specimens have been reported to reach a length of four feet from the tip of the snout to the tip of the tail. Our lizard has an over-all length of 32⅝ inches, with the tail comprising 21⅝ inches.

The lizard has an unusual appearance. From the head back, it looks surprisingly like the crocodilian Caimans that inhabit the same region. Thus the name "Caiman Lizard." On its back it has rows of enlarged scales, each bearing a raised longitudinal keel. Further back on the top of the compressed tail the keels form a raised border along each outer edge. The arrangement and appearance of these scales are amazingly like those of the crocodilians. The head, however, is quite different from that of the Caiman, resembling more closely that of a large Iguana.

The eyes of our Caiman Lizard are unlike those of either the Caimans or most lizards. The pupil is rounded, in contrast to the elliptical pupil of the crocodilians. The unusual thing about this eye is its uniformly dark brown color, giving the appearance of a solidly colored glass bead. The round pupil is not apparent at a distance of more than two feet. This is a condition rarely found in reptiles, many of which have highly colored and ornate eyes.

The partial resemblance of this lizard to the Caiman is not indicative of close relationship between the two animals (as it was thought in the Eighteenth Century). The external similarity is the result of an interesting parallel modification to a similar mode of existence – life in the water. In both of these reptiles the long, vertically flattened tail provides a strong organ of propulsion for swimming. Unlike the Caiman, however, the toes of the feet are not webbed in this lizard. Judging from its structural modifications, as well as from the few available reports on its habits, the Caiman Lizard appears to frequent dry land more often than does the Caiman. The rounded pupil suggests an animal that is active in the daytime rather than at night, as are the Caimans.

One of the most unusual features of the Caiman Lizard is its teeth. Virtually all lizards have sharp, conical teeth, either with a single point or the "trilobed teeth" with one large point and a small point on two sides. In the Caiman Lizard, the teeth in the front of the mouth are simple, sharp teeth with a single point. But on each side of the jaw there are four large, flattened, crushing teeth with rounded crowns. This is a rare condition in lizards, with few of the 3,500 known living species possessing such teeth.

These crushing teeth suggest a diet different from that of the majority of lizards that have the pointed teeth and are usually insectivorous or herbivorous. The only lizards known to possess such crushing teeth do have unusual feeding habits for lizards. They are reported to feed on shelled molluscs – snails and fresh-water mussels.

The arrow points out the broad, crushing and grinding teeth which enable the Caiman Lizard to feed on a variety of unusual foods—such as mussels and snails.

ide by side, an American Alligator and our new Caiman Lizard show a striking imilarity in the scalation f body and tail. Note the lifferent shape of the head.

The same diet appears to hold true for our Caiman Lizard, which had fed on small mussels shortly before its capture. Because of the difficulty and expense involved in providing it with a year around supply of fresh mussels, we are endeavoring to divert its appetite to simpler fare. To date, it has eaten sparingly of a mixture of raw egg and ground beef.

The Caiman Lizard was known to Europeans well before the Eighteenth Century, but was not described and given a scientific name until 1802. At that time, a French Biologist, F. M. Daudin, gave it the dramatic name *Dracaena guianensis*. This name literally means "the Female Dragon of Guiana." Daudin referred to this lizard by the French equivalent of the literal translation of its scientific name, "La Dragone de la Guiana." He believed that the newly described reptile was representative of a form intermediate between the crocodiles and the lizards.

There is little about our lizard to suggest any likeness to mythical dragons. The similarity that it shows to the Caimans is much more apparent and justifies the name "Caiman Lizard." Despite the inappropriateness of the association with the non-existent dragons, the rules that govern the use of scientific names compel us to retain Daudin's designation, *Dracaena guianensis*.

The Coyote Reappraised

By JAMES W. ATZ

THAT ANIMALS prey upon each other is a fact which has made a profound impression on man. "The struggle for existence," "the law of the jungle" and "nature in the raw" have become clichés. Quite naturally man's sympathies have favored those animals preyed upon rather than their killers. The defenceless rabbit and soft-eyed deer do not lack champions, but few are the defenders of the "cruel" tiger and "sly" fox.

The Coyote has come in for more than its share of opprobrium. It has been called "the archpredator of our time," the chief discouragement of our sheep-raising industry and a threat to the deer on many of our best hunting grounds.

"The Coyote is an asset"

Photo by Frank C. Craighead, Jr.

For many years, however, an increasing number of biologists and agriculturists realized that the Coyote is not necessarily a bad citizen and that its diet consists largely of rodents — such as rabbits, ground squirrels and field mice — that are pests to farmers and ranchers. But in the meantime millions of dollars were being spent on ever expanding programs of poisoning, trapping and hunting whose ultimate aim was apparently the extermination of the Coyote.

During the Nineteen-twenties and thirties a controversy raged between the advocates and critics of the policies and practices of the governmental agencies responsible for predatory animal control. The most telling criticism was that although hundreds of thousands of Coyotes and other predators were being destroyed, no one knew precisely what part they played in the economy of range, farmland or game preserve. No one knew, for instance, just what Coyotes did eat. One of the outcomes of numerous untrammelled discussions and disputations was that both federal and individual zoologists were stimulated to study the problem and to produce data telling exactly what Coyotes eat under all sorts of conditions.

The New York Zoological Society played a prominent role in those preliminary but vital activities. In 1929 it hired the noted mammalogist, A. Brazier Howell, to survey the predatory mammal problem. He reported on his work in a farsighted and challenging address delivered before the important 1930 symposium on predatory animal control held by the American Society of Mammalogists. When that group wished to send a special committee out into the field to study conditions at first-hand, the Zoological Society was the largest single contributor.

The Society's latest effort to bring about a rational view of predatory mammals is "A Biological and Economic Evaluation of Coyote Predation." This 23-page pamphlet appeared in July. It was written for the Society and the Conservation Foundation by Dr. Frank C. Craighead, Jr., well known vertebrate zoologist and ecologist who has spent several seasons at the Jackson Hole Biological Station of the Society, studying predation, especially with regard to owls, hawks and falcons.

One of the first points made by Dr. Craighead is that the Coyotes and raptorial birds of Jackson Hole both supplement and complement one an-

(*Continued on Page* 159)

News from the Conservation Foundation

Conservation Foundation Cooperates with Department of Interior on National Policy for Alaskan Resources

For two years the staff of the Conservation Foundation has been considering what our approach should be to the formidable problem of the conservation of Alaska's resources. This vast territory, representing our last area open to development, is chiefly federally owned, sparsely populated, and inadequately known as far as its potential resources are concerned.

In working upon earlier plans which aimed at surveys of the wildlife resources of Alaska it occurred to us that we should attempt a broader study of all Alaskan resources. To this end, Samuel H. Ordway, Jr., has devoted much time in recent months to the reading and digesting of available reports concerning current conditions in Alaska and this summer completed a document called "Alaska Now!" To verify some of his ideas Mr. Ordway was actually on his way to attend the Alaskan Science Conference at Mt. McKinley National Park in early September when a copy of "Alaska Now!" reached President Fairfield Osborn at Moose, Wyoming. At that time Secretary of the Interior Oscar Chapman was visiting Jackson Hole as a guest of Mr. Laurance Rockefeller. As the upshot of a discussion of Secretary Chapman's publicly announced proposal with respect to the Alaskan problem, Mr. Chapman suggested that Mr. Osborn go to Alaska for the purpose of making his own observations there and subsequently conveying them to the Department of Interior. Mr. Osborn declined this important invitation, pointing out to Secretary Chapman that Mr. Ordway was heading up the Foundation's Alaska project, had already prepared his preliminary report and was even at that moment on his way to the Alaska Science Conference to check some of his conclusions. It so happened that Secretary Chapman had known Sam Ordway long and favorably for the latter's work on the United States Civil Service Commission, and consequently it was happily agreed that Mr. Ordway should be the representative of the Conservation Foundation in acting as a consultant to the U. S. Government on "Future Policy for Alaska." Copies of "Alaska Now!" flew back to Washington with Secretary Chapman – one of them for President Truman – and postal cards from Sam mailed in Fairbanks indicate his conclusion that the assignment is rather large.

Fairfield Osborn Addresses Boy Scout Leaders

At the invitation of Mr. John Schiff, National President of the Boy Scouts of America and a trustee of the New York Zoological Society, our president, Fairfield Osborn addressed some 3,000 Scout leaders and personnel on September 7. The meeting was held in the auditorium of Michigan State University, East Lansing, Michigan. This convocation was preliminary to the institution of the Scouts' conservation program on which Foundation staff members have been collaborating with Scout headquarters for the past year and a half.

BEHIND THE SCENES

NEWS AND NOTES OF THE ZOOLOGICAL PARK, THE AQUARIUM AND THE DEPARTMENT OF TROPICAL RESEARCH

Dr. James A. Oliver Appointed Curator of Reptiles

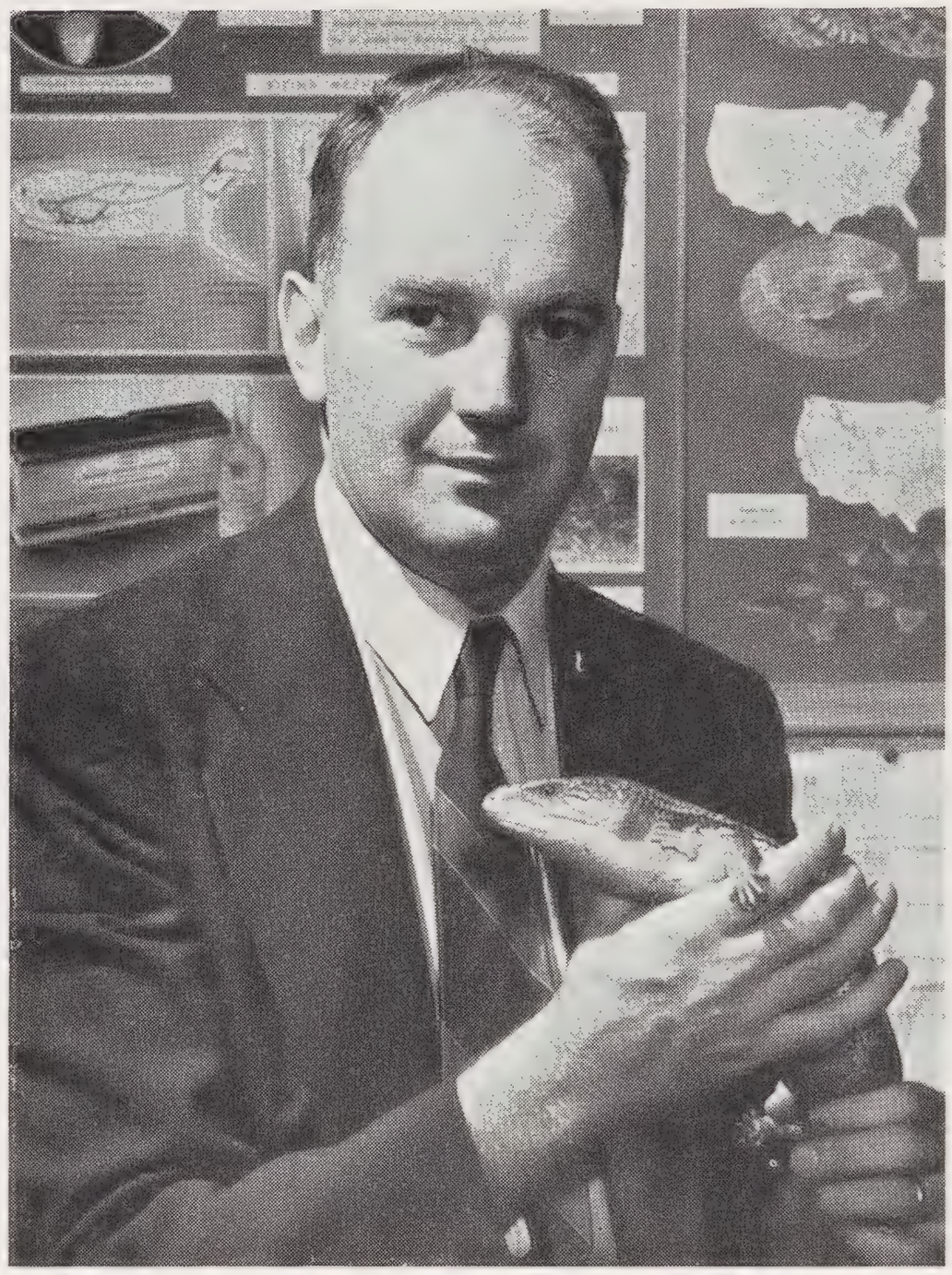
Dr. James A. Oliver has been appointed Curator of Reptiles at the Zoological Park, and assumed his new post on September 1.

He is the New York Zoological Society's third Curator of Reptiles in the fifty-two years of its history, succeeding Dr. Raymond L. Ditmars who was in charge of the snakes from the opening of the Zoological Park in 1899 until his retirement and death in 1942, and Brayton Eddy who held the curatorship from 1945 until his death in 1950.

Dr. Oliver is a native of Caruthersville, Mo., and is a graduate of the University of Michigan where he received his doctorate in 1942. From that year until 1947 he was an assistant Curator on the staff of the American Museum of Natural History and an Associate Curator from 1947 to 1948. Since 1948 he has been an Assistant Professor in the Department of Biology of the University of Florida.

He is a Fellow of the New York Zoological Society, a Research Associate of the American Museum of Natural History, and a member of the Board of Governors of the American Society of Ichthyologists and Herpetologists, a Fellow of the Herpetologists League and a member of the Society for the Study of Evolution, the Society of Systematic Zoologists, and Society of Vertebrate Paleontologists and the Florida Academy of Sciences.

Besides doing incidental collecting in many parts of the world during the war, when he was in the Navy, Dr. Oliver has made two expeditions to southern Mexico for the Museum of Zoology of the University of Michigan, two expeditions to the Bahamas for the American Museum of Natural History and the University of Florida, and for two summers worked on fresh-



Dr. Oliver

water fish surveys for the State of New Hampshire. He has maintained several collections of reptiles and for two years took care of a research collection of poisonous snakes for the St. Louis University Medical School. Dr. Oliver has written many technical articles on herpetology and ichthyology for professional journals.

* * *

A modern cafeteria is being installed in the old Picnic Pavilion in the center of the Zoological Park, and will be opened about the middle of October. Question House, occupying part of the building, reopened September 11.

Happy Sequel to the Story of Our Red-billed Blue Magpies

Last spring a pair of Himalayan Red-billed Blue Magpies, which we had presented to the Botanical Garden, escaped as their cage was being transported, and the birds nested at liberty in the Botanical Garden. Our rescue of two of their three nestlings from boys who were raiding the nest was reported in the July-August ANIMAL KINGDOM.

Now we have the two parents. After the nestlings were removed, the old birds stayed in the vicinity and we have been getting occasional reports of areas in which they were seen. Recently they have been hanging around the old Snuff Mill that is used by the Botanical Garden as a workshop, and the time seemed ripe to take them into custody.

Head Keeper Scott of the Bird Department put a box trap on the roof of the Snuff Mill, baited it with fruit, and stationed a keeper at a window with a string leading to the door of the trap. Half a day's vigil paid its first reward on September 12 – one of the Magpies entered the trap and was caught. The next morning the second bird succumbed to temptation and was carried back to the Zoo.

So now we have the family, parents and two young birds, but they will have to be exhibited separately. The young, while perfectly able to pick up food for themselves, are still in the stage of fluttering their wings and begging to be fed when a keeper approaches, and it is possible that the parents – their urge to care for their young having worn off by this time – would resent the importunities of their offspring and attack them.

Two Staff Members Present Papers at Conferences

The facilities of the Zoological Park for the study of animal behavior and animal psychology were emphasized by Executive Secretary John Tee-Van at a conference at the Roscoe B. Jackson Memorial Laboratory in Bar Harbor, Me., in September. The general theme of the meeting was the Effect of Early Experience on Mental Health.

At the end of August Dr. Myron Gordon gave a paper on "Genetics and Correlated Studies of Normal and Atypical Pigment Cell Growth" at a meeting at Smith College, Northampton, Mass., of the Society for the Study of Development and Growth.

Boston Road Is Closed

Ever since the opening of the Zoological Park in 1899, its 252 acres have been bisected by Boston Road, connecting the West Farms area of the Bronx with Pelham Parkway. In September, as a result of the completion of the southerly extension of the Bronx River Parkway parallel to the Boston Road, that road was closed by the Park Department and has been turned over to the Zoological Park. Temporarily it is being used only for access to the Boston Road Parking Field and for additional parking of automobiles on crowded days, but it will eventually be fitted into the major development plan of the Zoo.

There's No Trouble — Now — On Lion Island

Last spring when we gave our six young male Lions their liberty on Lion Island, it was with the expectation that reasonably complete harmony would reign among them. After all, they had been reared together from a very early age, they were all males, and no signs of truculence had been detected.

The situation changed during the summer, however. One Lion developed a quarrelsome streak and was constantly starting fights, for no particular reason that we could discern.

It sometimes helps, in such cases, to remove the aggressor for a couple of weeks, thereby giving his victims a chance to attain a kind of solidarity that would keep the aggressor in check.

We tried that. It didn't work. The rambunctious Lion rejoined the group only to start a new series of fights – as usual, taking on only one of his mates at a time.

Once more he was removed for two weeks, and this time, when he was released, General Curator Crandall had come to the conclusion that the best way to handle the situation was to let the Lions do it themselves; the six are, after all, still quite young, not inherently "mean," and unlikely to do each other any real damage.

His estimate of the situation was correct. The aggressive Lion started fighting again, and over a period of two hours there were sporadic battles, but near the end all five of the previous victims piled into the fray and the "tough" animal was decisively defeated. For several days his mates would not allow him to approach them, but gradually that hostility wore off and now all six are living in amity.

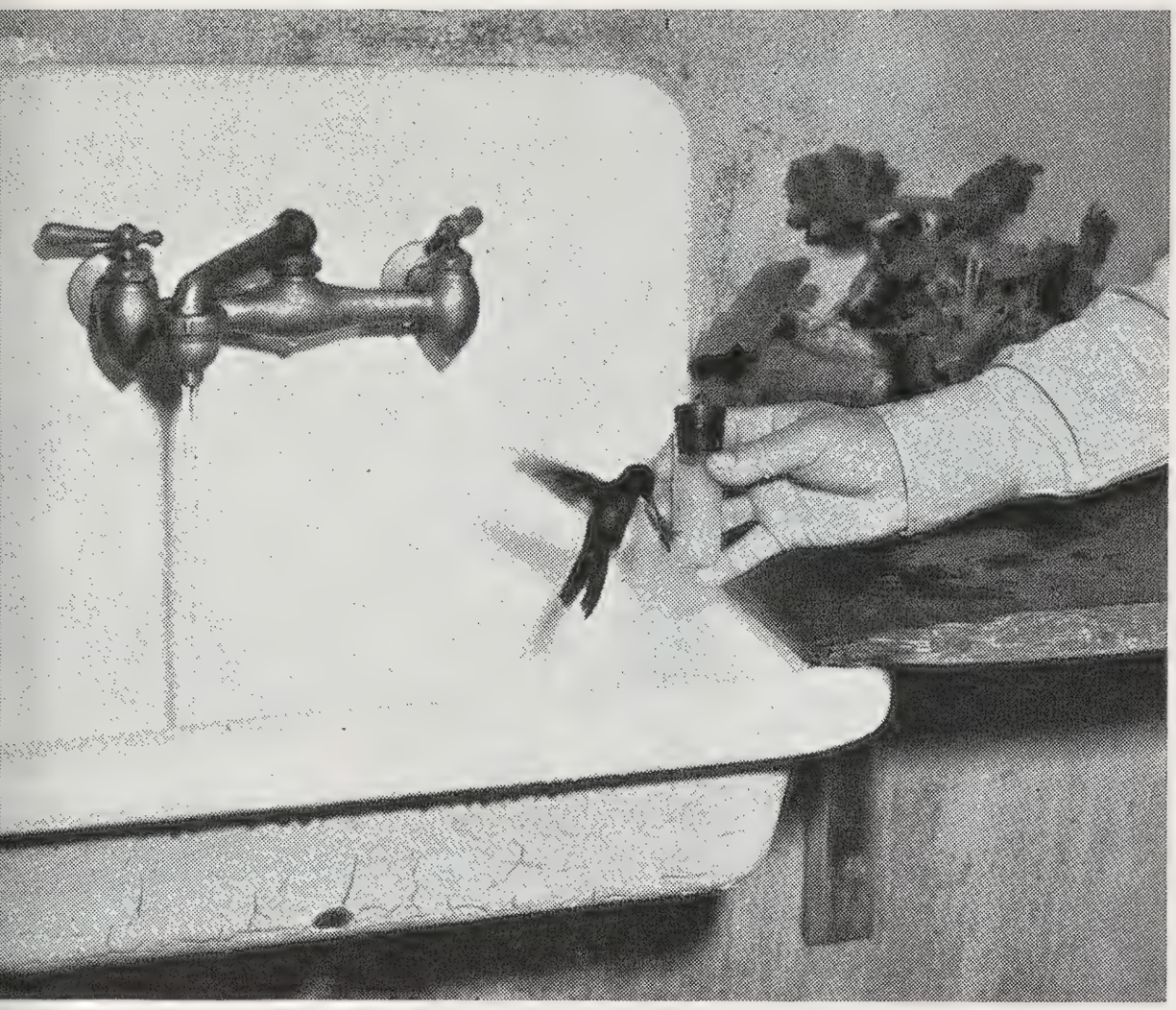
* * *

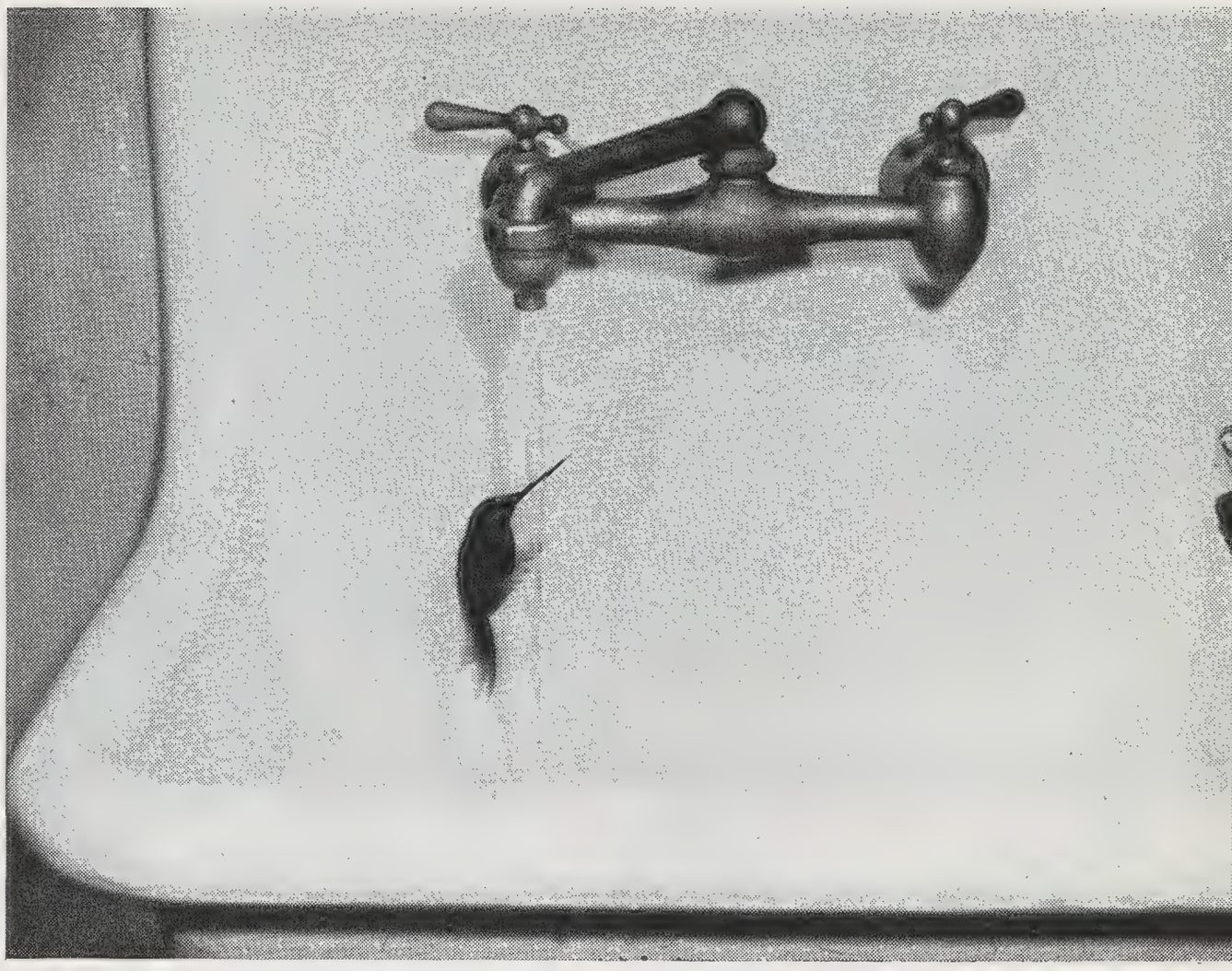
A new Shoebill, acquired on July 7, is turning out to be a problem bird. He refuses to eat unless a keeper talks to him and cajoles him into picking up a fish. That was all right as long as the bird would feed during working hours, but recently he has refused to eat until dusk and now the night watchmen are taking turns talking to "Herman" until he picks up a mackerel.

* * *

Evil-smelling paradichlorobenzene flakes in a mixture of "tanglefoot," the sticky substance used on flypaper, was applied this summer to the bark of a tree in the new Elephant Moat to keep the animals from pulling the bark off. It worked.

Our four Angola Colobus Monkeys — rare, beautiful and lively animals — huddled together on a cool morning to provide this study. They are quartered outside the Small Mammal House.





Some weeks ago when Head Keeper of Birds George Scott began his routine cleaning of the Hummingbird compartments, working in the small room behind the Jewel Room in the Main Bird House, a Comte de Paris' Star Frontlet zoomed out of its cage and was at liberty in the enclosed room. Since it could easily be recaptured, the Head Keeper went on working. As he was filling a food-bottle, the Hummingbird darted down and began to feed from it in his hand. A moment later it began to bathe under the running tap, and subsequently it followed the bottle back into its compartment. After that, it was given its liberty for a meal and bath every day.

THE COYOTE REAPPRAISED

(*Continued from Page* 154)

other in the kind of prey they consume. This is an excellent example of the dynamic balance among natural populations. Winter activities of Coyotes at Jackson Hole were scrutinized, and their usefulness in keeping down the tremendous numbers of field mice is emphasized.

Finally, Dr. Craighead utilizes the available figures on stock losses to Coyotes, on what Coyotes feed upon and how much they eat, on the losses caused by crop- and herbage-destroying rodents, and on the cost of present programs of Coyote and rodent control. All these he evaluates and puts together, attempting to determine how the good that Coyotes do by keeping down rodent pests compares with the harm they cause by killing sheep. Never before has such an inclusive statistical analysis been made, giving a nationwide, dollars and cents appraisal of the situation. The conclusion drawn is tentative, but the way is clearly indicated for further determination.

His verdict? "Coyotes are a desirable and indispensable part of a collective predator population which serves to regulate prey populations on wildlife lands. They perform a useful function as scavengers and they do more good as rodent destroyers than harm as killers of livestock. Nevertheless, some control appears desirable and it should be tailored to fit local conditions and must vary in intensity with land use practices. . . . It appears that in a weighing of overall economic values, the Coyote is an asset."

PUBLICATIONS OF INTEREST

ANIMAL TOOLS. By George F. Mason. Drawings by the author. 94 pp. William Morrow & Co., 1951. $2.00.

The mechanisms by which animals are enabled to do so many astonishing things – the Ichneumon Fly to drill into a log or the Leaf-sewing Ant to construct a nest by using its offspring as a "needle," for example – are simply explained in this latest book in Mr. Mason's series which includes Animal Tracks, Homes, Sounds and Weapons. Excellent drawings by the author (who is on the staff of the American Museum of Natural History) supplement the text. This is an excellent book to excite a child's interest in nature.

STRIPE: The Story of a Chipmunk. By Robert M. McClung. Drawings by the author. 46 pp. William Morrow & Co., New York, 1951. $2.00.

THUNDER WINGS: The Story of a Ruffed Grouse. By Olive L. Earle. Drawings by the author. 46 pp. William Morrow & Co., New York, 1951. $2.00.

Two more titles in a series of "story of" books about more or less familiar animals, in which the life histories of the subjects are told in story form for children. The natural history is accurate, the animals sympathetically portrayed, and these books should give a child a vivid insight into the lives, the problems and the adventures of wild things. Mr. McClung needs no introduction to members of the Zoological Society, since he is Assistant Curator of Mammals and Birds, and the author of an article on the Gray Squirrel in the July-August issue of Animal Kingdom.

GOLDEN HAMSTERS. By Herbert S. Zim. Drawings by Herschel Wartik. 63 pp. William Morrow & Co., New York, 1951. $2.00.

From a single litter of Hamsters collected in Syria in 1930 are descended the thousands of these engaging pets and useful laboratory animals now scattered over the world. Dr. Zim, in his usual forthright, hard-packed style, tells about their discovery, popularization, habits and life history, and by text and drawings explains how to keep them as pets.

A GUIDE TO BIRD SONGS. By Aretas A. Saunders. Doubleday & Company, Inc., Garden City, New York, 1951. xiv + 307 pp., 200+ diagrams. Price $3.00.

Many efforts have been made to interpret the songs of birds in some form of musical notation. However, until Mr. Saunders devised his system of "musical shorthand," none has been essentially successful. In "A Guide to Bird Songs," the numerous intrinsic qualities are adequately expressed.

More than fifteen years have passed since this invaluable book first appeared. In this new printing, twenty-six added pages are devoted to new material covering the songs of birds not previously included.

—Lee S. Crandall.

ECOLOGICAL ANIMAL GEOGRAPHY. Second Edition. By W. C. Allee and Karl P. Schmidt. 715 pp., illus. John Wiley & Sons, Inc., New York, 1951. $9.50.

The special task of this book is to elucidate those ideas and principles that make understandable the distribution of the world's billions of animals (divided into more than a million different species) within the 350 million cubic miles or so of space comprising our earthly biosphere. When we are confronted with such stupendous figures, it is obvious that our only hope of ever comprehending even a portion of them lies in the generalizations we are able to synthesize from their study.

This is a detailed revision and extension of the original English text, which was published in 1937 and which was in turn based on Hesse's German classic of 1924. The amateur zoologist may find it somewhat heavy fare; he will nevertheless run across very little that is actually indigestible – for its two American authors are both masters of simple, direct prose. The specialist will, of course, be able to point out minor sins of omission and commission, but for every real or imaginary defect he turns up, he will discover a score of new and stimulating facts. – J.W.A.

The Story Behind Bambi, Brownie and Baby

(*Continued from Page* 150)

thoughts, just what his were when we left him alone, though it was only a matter of a few minutes. Since we were in a hurry at the time, I failed to clean the 'sleepers' out of their eyes. So at the airport, with spectators galore, the gate of their crate was opened, and taking them under the chin, one by one, I wiped their eyes with a kleenex. That was the last time I touched my Gazelles on Lebanese soil.

"Now that I know my Babies arrived safely (tell Mr. Crandall that nothing was so eagerly awaited and welcome as his cable), I feel content and am pleased that my efforts were not in vain. This was not an ordinary shipment of animals to a Zoo, but more like a mother sending her children to a far off summer camp and awaiting news of their safe arrival. Now my one thought is – will my three baby Gazelles recognize me, my voice, when I see and speak to them late this fall? If they do, that will be the crowning point of my adventure!"

New Members of the New York Zoological Society

(Between July 1 and August 31)

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Robert G. Goelet
W. S. Ladd, Jr.
Philip Spalding
Edwin S. Webster, Jr.

Contributing

Anthony A. Bliss
Dr. V. G. Damon
Alvin Devereux
Max Gschwind
John Horn
Charles J. Mylod
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Gustave J. Soderberg, Jr.
Leo Spichler
Mrs. J. C. Traphagen
Chauncey L. Waddell

We're Ashamed of Our Brush Turkey

DO YOU KNOW what kind of a mother *she* is? — Lays her eggs in a pile of jungle debris and lets the heat hatch the turklets! Then the poor little things have to rustle for themselves, for mama's gone away!

It's hard work to get some birds to take responsibility.

This brings us around to the fact that now you are back from the country, won't you please send us the names of those friends who *ought* to be Society members? We need more members — we want the support of more people who have a natural interest in our work. We think it is *your* responsibility to let us know who they are and where they live. It will be *our* responsibility to follow them up.

Send names and addresses please to:

MEMBERSHIP CHAIRMAN,
New York Zoological Society,
30 East 40th Street,
New York 16, N. Y.

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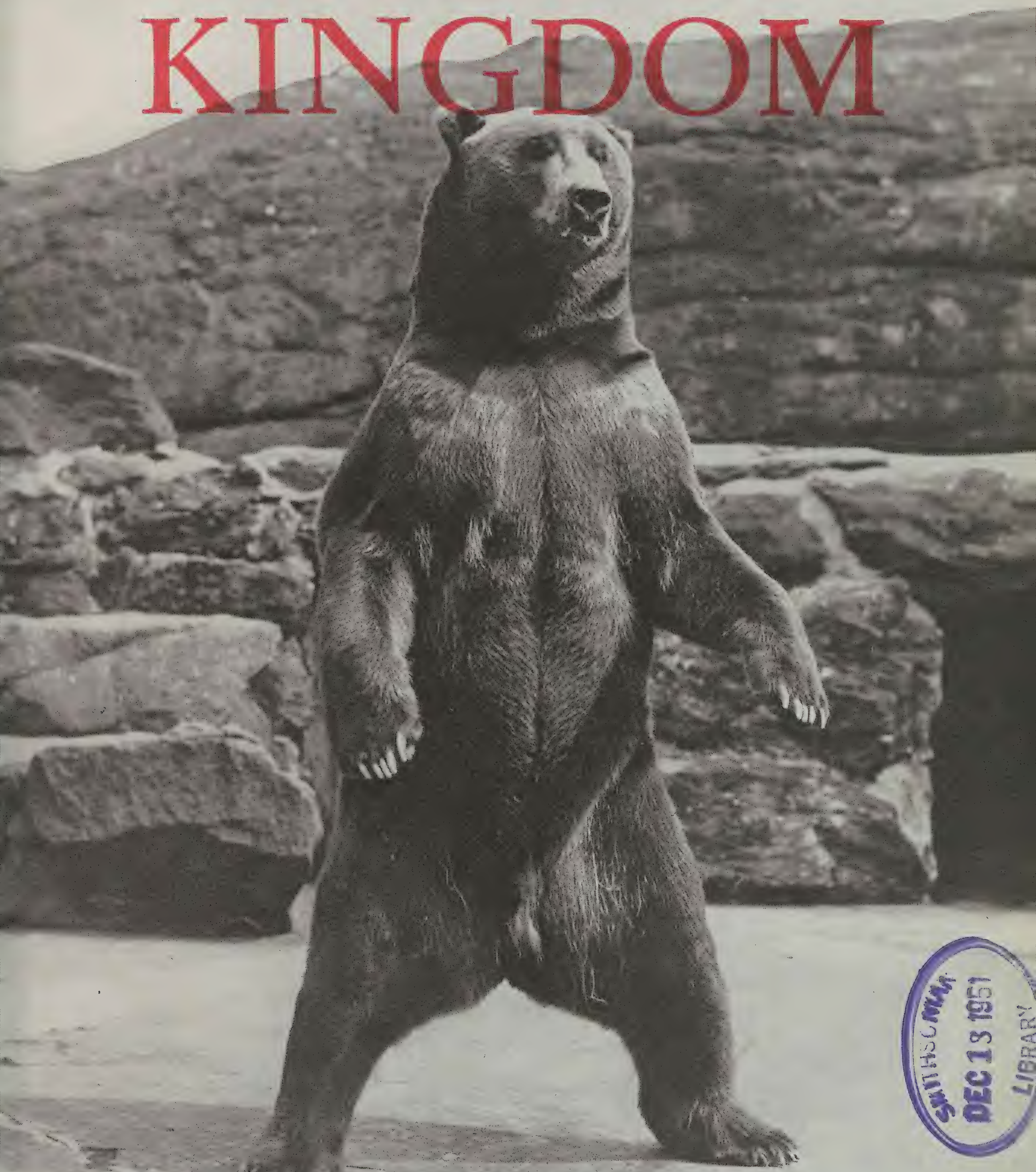
ANIMAL KINGDOM



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ANIMAL KINGDOM

Bulletin of the
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Zoological Society

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The Shadow of the Curtain

SEVERAL YEARS AGO, when Winston Churchill used the phrase "iron curtain," he evoked an image of an impassable barrier between the people of the Western World and those of the Soviet Union. The image created by these two words is not a true one. While events have proved that the barrier into Russia is impassable from the *outside*, there is virtually no barrier from East to West. The Soviets have constructed a one-way street carrying a constant and immense traffic of ideological power, of threats, and of fear. Its cargoes are unloaded the world over, irresistibly influencing the economy and cultures of every country.

It is hard to realize that these influences, spewing out from the one-way street the Soviets have built, strike directly at the continuing welfare of our cultural institutions. This, no doubt, is as the Soviets would wish it and it is well to recognize the ugly fact.

Take, for example, the effect upon our own Zoological Society, whose plans for the great new Aquarium have had to be set aside, the completion of the Conservation Exhibit at the Zoological Park held in abeyance, as well as numerous other projects involving physical growth or educational and scientific advancement. Yes, we are in the struggle, too.

Let us ourselves be prepared to meet this continuing challenge. Our Society is part of the American scene, enriching the lives of millions of people each year, making its own special contributions to recreation, to education and to scientific knowledge. No, we must not be checked, nor stopped, nor lose our sense of permanency and growth. As never before, it is the time when all who believe these things can render support.

Fairfield Osborn

A Wedge-tailed Eagle for Christmas

THE CHRISTMAS SEASON of 1937 – fourteen long years ago – will always be memorable to me because it brought me Horatius. A baby Wedge-tailed Eagle for Christmas! To me that was the most welcome of all presents, and I fell in love with the baby at first sight. I may say that Horatius returned my liking; indeed, I suspect I am the only man who has ever been considered by a Wedge-tailed Eagle as its mate, and who felt duty-bound to help it build an eyrie.

I literally picked Horatius off the Christmas tree. Actually, it was somewhat in advance of Christmas, on a fine morning in early November, when Messrs. Dudley Dickison and Jim Slater, and my very small daughter Betty and I stood on the brink of the Coimadai Gorge, near Bacchus Marsh in Victoria, and surveyed the possibilities of climbing a crazily-rooted eucalypt that thrust its limbs in thin air beyond the rocky sides of the cliff.

Forty feet up, lodged in the weathered branches, reposed half a ton of sticks. Occasionally a snowy white head bobbed above the brim for a moment. It was the old, old eyrie of a pair of Wedge-tails and as we stood there they could be seen as circling dots in the blue sky.

We knew there were nestlings in that tree-top cradle, but the problem was how to reach them, for the tree and the eyrie looked terribly insecure. In fact, only five years later the storm-wracked tree and the eyrie broke loose of their own weight and splintered on the rocks so far below.

The tree trunk itself could be climbed easily enough but the dangerous part was to come at the nest from below, to reach around

By DAVID FLEAY

This proud bird, five years old here, is the author's Wedge-tailed Eagle. At the right: making a training flight.

All photographs by the author unless otherwise credited.

Photo by S. A. Pearl

the thick lip and into the "dish" where the nestlings were. The nest was many years old; the sticks that composed it were dry and fragile and many a one crumpled and snapped as I grasped them. It was possible to brace one's body in such a way as to reach well into the nest, although to do so I had to kick off my boots, for better footing against the tree trunk. As the boots bounced off the rocks on their way down into the gorge, I saw a Goshawk swoop lightning-fast at the falling objects. Evidently she was nesting somewhere on the cliff-side, and was disturbed by these "intruders."

There were two eaglets in the nest. Hanging fly-like to the rotten sticks, my heart pounding furiously, I reached slowly inside and could barely grasp a soft and woolly-downed wing. Drawing the young bird gently to the edge, I was just able to lift it up and out and toss it into Dudley Dickison's lap, where he sat in a forking branch ten feet below. We knew there was another nestling, but I had had enough of this precarious activity above a rocky gorge, and I climbed back and down.

Thus Horatius came into my life. He was a never-failing source of interest and pleasure during the first years while he was passing from downy whiteness to an attractive golden brown, with black wings and tail primaries. In his sixth

An average-sized hen's egg is shown at the right for comparison with a four-ounce Wedge-tailed Eagle egg.

year he developed the almost black, and quite sober, plumage of maturity.

The bird's affectionate regard for me, his master, resulted in his development of an absolute phobia about members of his own kind and for the whole period of his early years, while he was being trained as a specialized hunter, he repelled with violence any attempts to domicile him with either male or female Wedge-tails. These patient but abortive experiments covered a range of at least three females and three males of varying temperaments, over a period of fully ten years. Whether I liked it or not, Horatius had settled on me the lifelong loyalty of eagle mateship. All other eagles were anathema.

Usually about July (the Australian winter) Horatius each year built his seasonal nest on an elevated platform in the corner of the aviary. Working chiefly in the morning, he welcomed dry eucalypt sticks, green foliage from the swamp gums and strips of dry bark, and always redoubled his efforts at construction whenever I arrived on the scene.

Last year, in 1950, I took pity on poor lone handed, but none the less ambitious, Horatius. In other years I had not particularly encouraged nest-building, but now I spent odd minutes in the days of late July and early August humoring the bird by climbing up a ladder at the nest and not only taking up additional material but pretending to arrange it. Horatius was most delighted and excited, not only talking vigorously, but gently "beaking" my ears and hair with that formidable but amazingly gentle weapon. Occasionally the eleven-pound, steel-muscled bird landed on my shoulders or back. He exhibited terrific jealousy and excitement if a wild Wedge-tail circled in the sky above, obviously listening to the shrill ascending "I see! I see!" challenges from the bush below.

The nest grew into quite a strong and creditable eyrie, big enough for me to sit comfortably in its lining of fresh gum leaves. In fact, Horatius seemed proud for me to do so. The gleam I detected in his imperious eye should have warned me that something rather unusual was afoot.

In the early afternoon of August 25, 1950, the truth came out. Our big black eagle was discovered sitting tightly. I stood and stared, thinking: "It certainly looks as if Horatius has laid an egg." As I watched, Horatius rose momentarily on his shanks and let his nest-building partner into the secret. He *had* laid an egg, a fine big one, the first in thirteen years. It was a wrench to stop thinking "Horatius" and "he," and remember to say "Horatia" and "she," but it had to be done.

Preparing to settle down and incubate her eggs, Horatia always first nudged them toward her by a gentle, easy movement of her beak.

Her toes and talons were curved inward to form a "fist" as she squatted over the eggs, insuring that the clutch would not be damaged.

Four days later Horatia laid a second buffy-white egg. Like the first, it weighed four ounces, although it was comparatively free of the reddish-brown spots and blotches of No. 1, being merely washed here and there with faint brown and an odd lavender blotch.

The fact of Horatia's continuing strong attachment to me now took on new value because of the opportunities it made possible to observe a brooding eagle's ways. Horatia trusted my every move and acted for all the world like a friendly broody hen.

For such a powerful-footed, heavy-bodied bird, Horatia was infinitely gentle. Most striking was the fastidiousness of her settling on and moving off her eggs. After landing on the solid edge of the nest, she usually approached the clutch with deliberate steps until, standing a few inches behind the eggs, she beaked them gently. Then she squatted on her shanks, closed her great toes with their massive curved talons until each foot formed a tight "fist," and cautiously shuffled forward, at the same time pulling the eggs toward her with her beak. Finally she dipped forward to settle over them in a comfortable, flat, brooding position.

She was seldom off, and brooded closely from the laying of egg No. 1. Occasionally my arrival with food brought her off for a meal. She sat with pathetic devotion while the cold winter rains dripped from her sleek plumage. One could think of far more comfortable things for a bird to do than to sit on infertile eggs on a damp nest, particularly on nights of hard frost when the temperature fell below the freezing point.

After two weeks of brooding Horatia began to

Now sixteen days old, the eaglets are being given a fragment of rabbit meat. At first her saliva covered the meat and aided in the quickness of its digestion.

seek small but regular sprays of green gum leaves, adding them to the nest lining so that the eggs rested on clean material. Every day there was some interesting observation to be made, and I decided that not only was it right to make an attempt to provide the hopeful bird with the ultimate joys of motherhood but by so doing I might teach her to live with her own kind, while I would be provided with further opportunities to study the relationship between "mother" and "offspring."

Accordingly an S.O.S. was sent to the noted ornithologist, Mr. Norman Favaloro, of Mildura, in Victoria's Mallee country, asking if he could find either a clutch of fertile Wedge-tailed Eagle eggs or newly hatched youngsters to be rushed down to me by plane. By a lucky coincidence, Mr. Favaloro had lately, on August 30, found eaglets actually hatching in an eyrie at Karawinna, Victoria. He hastened to the eyrie and secured two attractive little fellows, sewed them up in hessian bags for warmth, leaving only their heads projecting, and sent them the intervening 300 miles overnight.

The startlingly white, fluffy eaglets arrived at Badger Creek on September 13 when they were just 15 days old. (Horatia had then sat 20 days, about two weeks short of the normal brooding period.) The obviously older of the nestlings weighed 2 lbs. 15½ ozs. and the smaller 2 lbs. 13 ozs. Their thick woolly down was efficient insulation from the cold, and their snowy appearance was relieved by the polished black talons, the tips of firm beaks and the merest suggestion of wing pin feathers. Feeding the little fellows until their crops bulged, and waiting until darkness fell, I mounted the nest ladder and, taking one egg from Horatia, quickly pushed an eaglet beneath her. She was perplexed and uneasy but had perforce to cover the newcomer in order to keep the remaining precious egg warm.

Next morning the dawn light revealed an astonished Horatia, puzzling how a four-ounce egg had suddenly become an almost three-pound chick. But the wobbling, bright-eyed eaglet was quite unperturbed. Horatia's maternal instinct gradually overcame her doubt and soon she flew off, selected a portion of rabbit and returned. She stood with it beneath her talons in the bottom of the nest and tore off a minute piece which she fed to the youngster while her saliva fairly dripped over the morsel and into the eaglet's beak. She treated it, naturally, as a newly-hatched infant and not as a self-possessed fortnighter. The first feeding over, she settled down again and covered eaglet and egg. An hour or so later I removed the egg and substituted the second youngster.

Horatia did not accept this substitution with equanimity and regarded her new chick with suspicion for several days. Until she took to feeding it consistently I supplied its nourishment for almost a week. Youngster No. 1 had to call vigorously to modify Horatia's ideas of the warmth necessary for "just hatched" offspring, but gradually as the days passed her instincts caught up with her foster children. She fed them with greater frequency and with larger and more satisfying fragments. Still her saliva dripped over the morsels, and noting this provision for ready digestion in the very young, I

understood the difficulties that had beset my earlier attempts to rear baby birds of prey. They had suffered not from lack of warmth but from alimentary difficulties! The observation was a new and valuable one.

It was noticeable that when Horatia flew to the nest in these early days with a carcass such as that of a rat, she held it beneath her talons and fed the youngster with considered care, herself swallowing the hard bones, feet and tail but giving the youngsters flesh strips and sections of softer bone. As usual, she deliberately tossed stomach and intestines over the nest edge.

Her nest hygiene was exemplary and at every possible opportunity she flew down for green leaf sprays and strips of bark, taking them up in her bill and stripping leaves from the branches so that they continually formed fresh, clean bedding beneath the "powder puff" youngsters. This procedure continued through the whole period of rearing, being obviously valuable as a deterrent to blowfly larvae which might otherwise transfer their attacks from nest carrion to the tender-skinned eaglets. As Horatia never carried more than a single leaf spray or stick at a time, either in these housekeeping activities or during the building of the nest, it was clear that birds of this species must cover numberless miles in the construction and maintenance of their eyries alone.

In the early morning of September 15 the second, and smaller, young one fell to the ground, but fortunately it was uninjured and I restored it before it had been out an hour. The next day torrential and very cold rain poured down without interruption the whole morning. Horatia did her best to shield her family, huddling half over them with wings partly spread, but with little effect. The eaglets became thoroughly soaked and were bedraggled and miserable in appearance. But in a mere half hour after the rain they dried out and were miraculously fluffy once more. They were indeed hot little birds and the incident explained the seeming indifference of the Wedge-tail to the cold and wet at the time of year when the species chooses to nest and rear young.

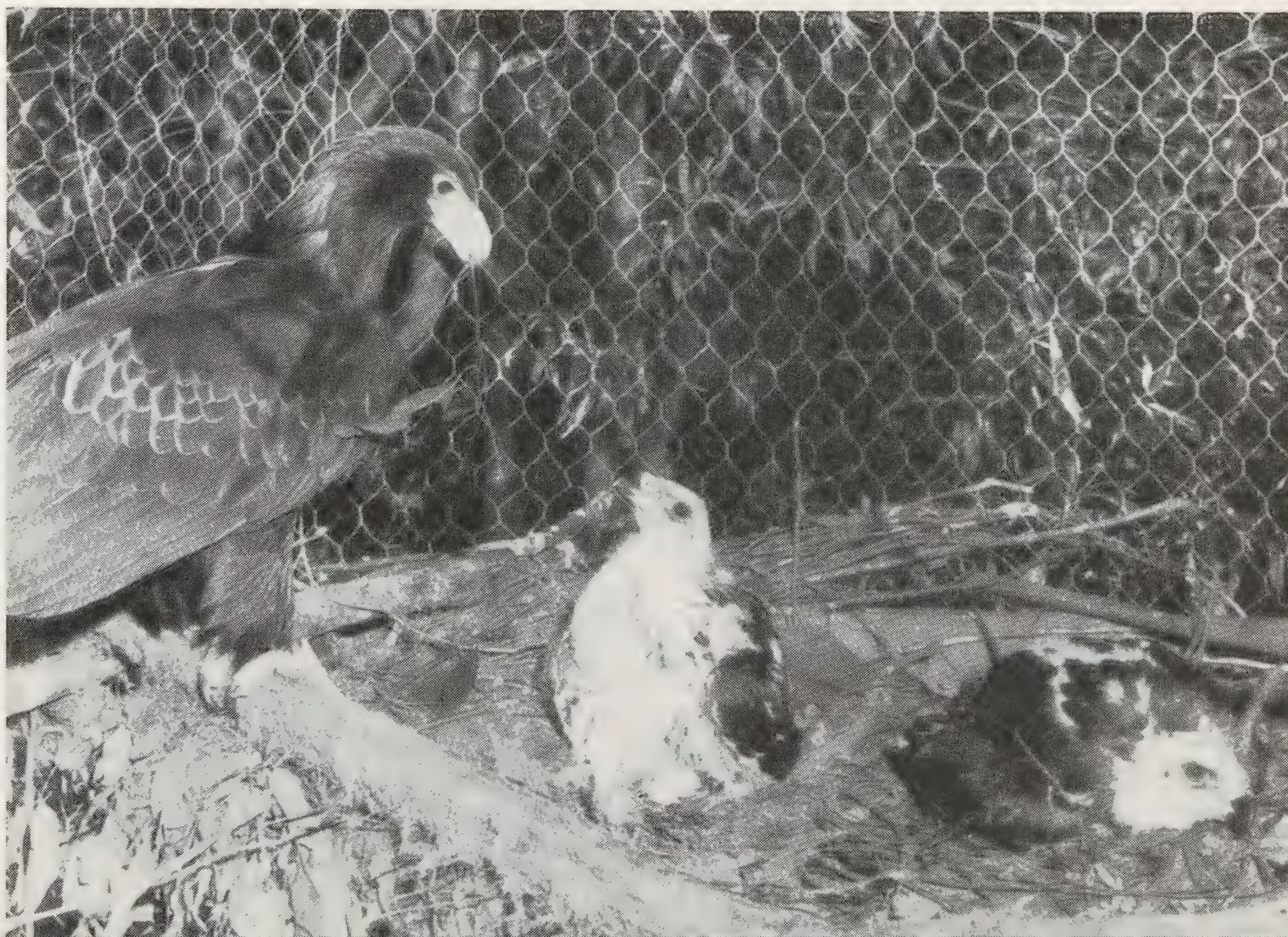
With her maternal instincts now in full play, Horatia, normally friendly with few people other than her master, developed into a veritable virago. At the approach of visitors she invariably dived from her high platform with its two bobbing snowy heads, and flew screaming and clutching with great talons at the wire netting of the aviary. Fiery eyes and bristling hackles added to the picture of ferocity. It would have gone ill with any stranger attempting to rob her eyrie!

When the eaglets were 27 days old, Horatia was first seen perched on the edge of the nest at night and not attempting to cover them. They had grown considerably and their weights at 29 days were:

No. 1 — 5 lbs. 8 ozs. (This was the first one hatched, and the most advanced in plumage.)

No. 2 — 5 lbs. 15 ozs.

Thus the younger bird had more than doubled its original weight since the day of arrival from Mildura and now had overhauled its elder brother. The weights were a good indication of the sexes of the two, and my surmise was borne out by the subsequent development and plumage, for the



A sprig of eucalyptus in her beak, Horatia arrives at the nest. Fresh material was constantly being supplied. The eaglets are now thirty-four days old, growing fast.

smaller and younger No. 2 eaglet was to grow into the bigger-bodied and heavier female. Both youngsters accepted me, albeit with cautious dignity, as a stand-in "father" and consented to take fragments of meat each time I climbed the ladder. Horatia usually fussed around when I fed her babies, flying in to the crowded nest with fresh leaves and a great stirring of air.

She continued to toss hard fragments of bone such as rabbit skulls beyond reach of the youngsters, for they were now inclined to pick up discarded morsels from the nest. She swallowed the hard pieces herself while beaking the usual choice and delicate slivers to the young birds. The little eagles, now just over four weeks old, were largely feathered on body, legs and wings and their tails were stubby, only their heads and necks remaining white and downy. They stood up on their legs a good deal without the wobble that was noticeable earlier, and presented much the same appearance as Horatia had when we took her from the nest so many years before.

At the age of five weeks the fuzzy down on the youngsters' crown had become much abbreviated, chiefly as a result of affectionate beaking and nibbling by the "mother" herself. Horatia fed them plentifully but judicially, so that they were never ravenous but became more firm and solid not only on their feet but in wing position. It was noticeable now that saliva was no longer provided by the female with her handouts of food. The young were disgorging pellets of balled fur from the bits of carcass fed them and these were generally thrown overside, probably by Horatia although she was not seen to do this. The whistling voices of the two eaglets were different in pitch; that of the bigger and younger bird (the female) being more of a rapid, shrill cry than her older brother's. At 37 days they were able to recognize and pick up scraps falling to the floor of the nest as their foster mother industriously tore up food for them, and within a day or two of this they began to pick at carcasses themselves.

On October 11-12, at six weeks, a heavy rainfall of 1½ inches began during the night and continued through most of the day, soaking both youngsters and Horatia. She did her inadequate best to keep them dry by huddling together with them, and as soon as the downpour eased she was busily employed adding quantities of green leaves to the nest floor. This constant provision of new lining material seemed to be essential not only from a health point of view but for comfort, for with the passing weeks the treading by twenty-four heavy talons reduced leaves and bark to tatters.

At seven weeks the eaglets were almost completely feathered except for their stubby short tails with the characteristic wedge shape. The sturdy young birds showed the merest remnant of their original down on neck and head, and had the typical eagle eye under beetling brow. They now seemed more wary and shy of the observer who came up the ladder to view them. Horatia still fed them carefully but they were more voracious and pulled pieces from prey under her feet. On one occasion I watched an eaglet seize and gulp down a whole rabbit forelimb with fur complete. Sexual differences began to appear; the elder male, weighing 6 lbs. 7 ozs. at seven weeks, was developing brighter plumage than the younger and heavier female of 7 lbs. 11 ozs. The male, too, was noticeably more vocal than his sister, screaming quite a deal, particularly if food was not forthcoming in sufficient quantity. Now it was found that the family could dispose of a rabbit and a half (local adult rabbits weigh approximately 3 lbs. 11 ozs.) per day. If the family had been complete, with an adult male, food consumption would have amounted to at least two rabbits a day. As in wild-built eyries, the youngsters always backed out and fired limey feces in a five-to-seven-foot trajectory in a complete circle around the nest, covering neighboring tree trunks and the ground below with characteristic whitewash. One certainly needed a hat in coming up that ladder!

The eaglets spent more and more time standing bolt upright, but not indulging in half-measures they otherwise rested lying flat down in the nest so that they were scarcely visible from the ground. They were still floppy and soft when lifted by the legs for purposes of weighing, but now they began to harden up like the tough, powerful adults of the species.

First flight occurred on November 6 at the age of 9 weeks and 4 days when the male flew across the aviary and perched on a limb. Both birds now resembled adults but for shorter tails,

golden-brown patterns and the down still adhering to the ends of crown and nape feathers—the latter particularly noticeable when the hackles bristled. Both eaglets were now capable of flying a certain distance and had hardened up considerably over the past two weeks. They had reached a playful age and put in a good deal of time pouncing and snatch-grabbing at sticks and bones and exercising their wings on the nest edge. The male whistled noisily, plaintively and continuously, and each time I visited the nest it bristled its hackles, while the bigger and more solid female proved rather retiring and was inclined to chirrup quietly in a more rapid undertone. The difference in vocal accomplishment was as marked as the difference in size.

Another obvious difference between adult and young, apart from the raven-like blackness of the older bird which was relieved only by the gray-edged wing coverts, was the color of the eyes. Whereas Horatia, like most adult Wedge-tails (six years old or more), had developed light brown irides, those of the youngsters were a clear gray.

Horatia fed her family well—notice the bulging crop of this youngster. The beak and feet are powerful instruments by this time—thirty-four days after hatching. This is the female.

From this time on it was noticeable that Horatia "rested on her oars," though she continued to add green leaves to the nest as long as the youngsters used it as a resting place. At night she camped on the nest side with the more venturesome male beside her. The female squatted flat in the nest.

From eleven weeks on, the eaglets made sorties to the ground and were observed flying about dragging rabbit carcasses to selected corners for feeding. There was a good deal of screaming when food was not produced on time. When they were three months old, Horatia flew with portions of rabbit to the eyrie but turned her back on the young birds who followed her. She ate her fill, abandoning only the leftovers to the youngsters. By flying savagely at visitors and screaming, however, she left no doubt in one's mind that her protective maternal instinct was still very much alive.

In January of this year, at four months, the wedge-shaped tails of the young eagles had attained full length and the perfectly groomed birds were magnificent in their smooth plumage, well formed black-tipped bills, clean, well-shod feet and proud, unafraid bearing. They acted as adults and had dropped the voraciousness so typical of the greedy and fast-growing stages. The only thing that struck fear into both Horatia and the eaglets during the whole nesting period was the advent one day of a large Black Goanna (*Varanus varius*). Even Horatia was extremely nervous and she reacted by uttering a single, loud, rather melancholy scream at intervals of several minutes—such a call as I had never heard previously.

By March, 1951, at six months, the differences between the young male and female were more pronounced. It was obvious at a glance, that the female was bigger, bulkier and longer-tailed. Her plumage was slightly duller, being more of a

(*Continued on page* 188)

TWO NEWCOMERS—

Darwin's Rhea

DURING THE HISTORIC CRUISE of the *Beagle,* the great Charles Darwin obtained, at a fort on the coast of eastern Patagonia, a crudely-made skin of a Rhea which was unknown to him. It was from this fragmentary specimen that Gould, in the *Proceedings* of the Zoological Society of London, in 1837, described "Darwin's Rhea."

At that time the Zoological Society of London had already exhibited its first common Rhea, a larger and grayer bird, so that many naturalists were quite familiar with its appearance. But Darwin's discovery, with brownish, white-tipped plumage, was an obvious novelty. We know, now, that it is not only smaller than the gray bird but that its body is curiously spherical, its head and beak short and eyes noticeably large.

While often referred to as South American Ostriches, the relationship of the Rheas to the great birds of Africa is more distant than first glance might indicate. The two groups represent, in fact, distinct Orders. Both are flightless and depend upon speed of foot for escaping their enemies; both live in open, grassy country where this special ability is most advantageous. But there the resemblance ends. Rheas have three toes on each foot, as compared with the Ostriches' two. The graceful, ornamental plumes of the Ostriches are represented in the Rheas by stiff, inelegant feathers. Unfortunately these appendages, so unsuitable for decorative purposes, have been in great demand for feather dusters, causing extensive destruction of the great runners of the pampas.

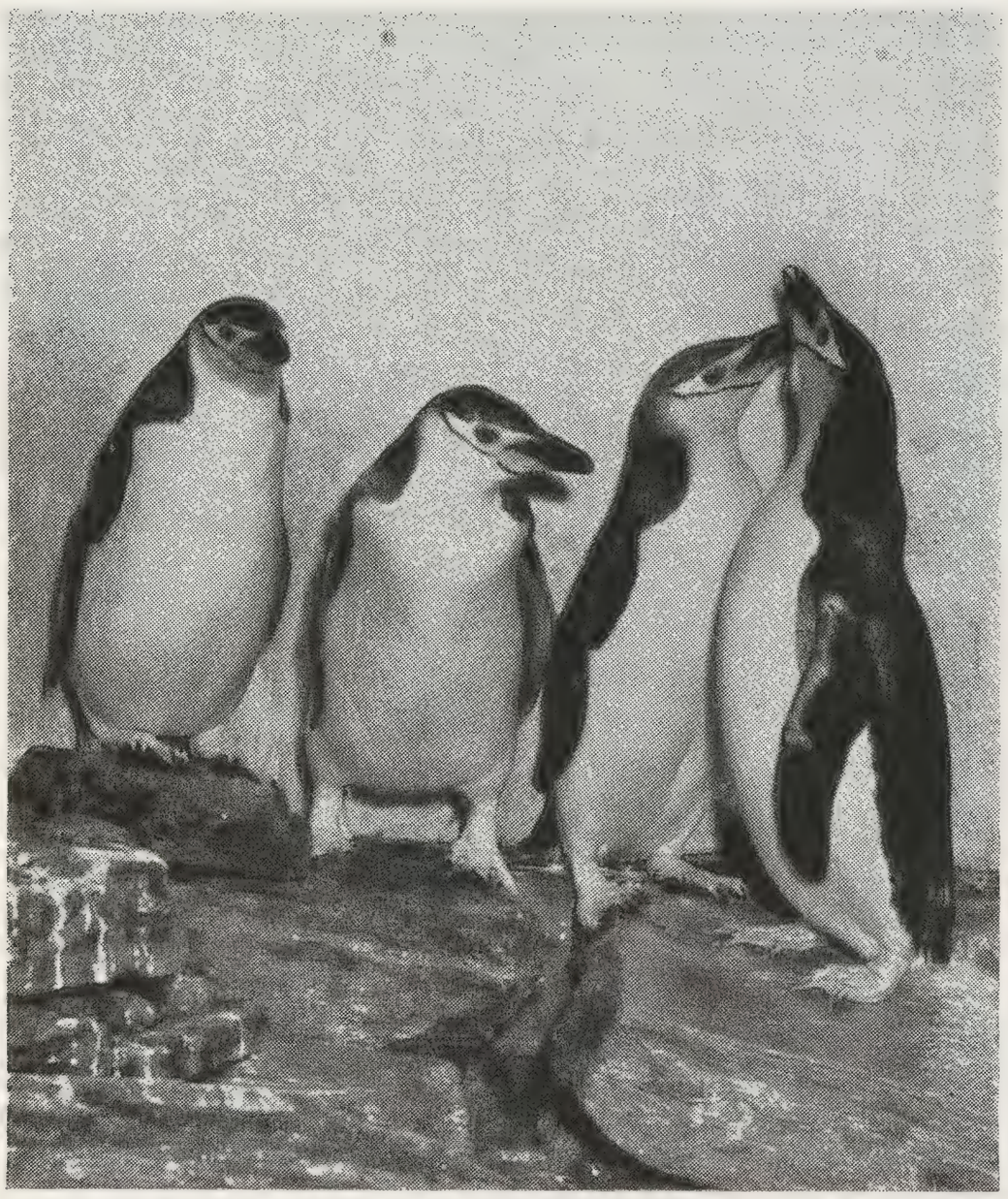
The Common Rhea, in various forms, extends from Brazil to Argentina. Darwin's Rhea inhabits the colder areas of South America, from Rio Negro to the Straits of Magellan. Several subspecies have been described.

The little Darwin, much the most attractive of the Rheas, has always been rare in collections of living birds. The remote areas it inhabits presumably have a bearing here, but its undoubted delicacy in confinement is certainly a factor. Zoological garden experience with Darwin's Rhea has not been good, even though it is hardy and indifferent to cold. The chief difficulty has been the bird's predilection for tough stems and roots which it is quite unable to digest, with resulting fatal impaction of the intestinal tract.

Through the interest of Mr. Robert G. Goelet, a Trustee of our Society, a lovely pair of Darwin's Rheas came to us, by air transport, on October 12. They have been installed in a well-scraped yard at the Ostrich House, where there is no indigestible growth to tempt them.

and a Good Try

By LEE S. CRANDALL



Ringed Penguin

ALWAYS we have been fully conscious of the great attraction penguins have for our visitors. For years, we have striven to satisfy this interest by maintaining exhibits of these quaint birds of the southern hemisphere. We did finally achieve the establishment of a breeding, acclimatized colony of the Black-footed species of South Africa and of hybrids between this bird and the Humboldt's Penguin of South America.

Finally, we became involved in an effort to exhibit the more unusual species from the frigid areas farther south, which cannot live with us unless protected from heat and the ever-present spores of the killer mold, *Aspergillus*. Somehow, immersed as we were in technicalities, we were not entirely prepared for the burst of popularity that greeted the opening of our new Penguin House on June 15, 1950. Penguins marching sedately on land had been amusing because of a grotesque suggestion of walking men. Penguins seen under water, through the clearest of glass, were transformed into creatures of incredible speed, grace and agility.

We had four species in our new group – huge, beautifully colored Kings, bumbling Black-foots, a graceful Gentoo and a dumpy little Rockhopper. It seemed a very fine lot, indeed, until we received an offer of Ringed Penguins from the Royal Zoological Society of Scotland, in Edinburgh. Then we realized that our list was limited and that if four species made a good exhibit, five would make a better one. When the four new Ringed Penguins finally arrived on October 8, 1951, we felt fully justified.

Smaller than the King but larger than the Black-foot, the Ringed Penguin is comparable in size to the Gentoo, to which it is generically related. It is plainly colored, black above and white below, with a narrow throat-strap of black, from which it gets its name. Like the Gentoo, the Ringed Penguin has a surprising ability to leap clear of the water and land upright on a ledge two feet or more above the surface.

The Ringed Penguin is a truly Antarctic species, breeding chiefly on islands of the South Orkney and South Sandwich groups, below South America, with extensions to other islands of the "American quadrant." The species is reputed to be both aggressive and quarrelsome but so far there has been no evidence of these undesirable traits.

The Platypus—A Good Try

When David Fleay arrived from Australia on April 25, 1947, bringing us three living Platypuses, no one had the slightest idea that two of the rare little creatures would be with us in 1951. Only one Platypus had previously survived the journey to a foreign land. This was a specimen transported to New York in 1922 by Ellis S. Joseph and which lived with us for 47 days. With only this isolated instance as a precedent, there was no basis for optimism as to longevity.

During the first three summers following their arrival, the Platypuses were shown for one hour daily and of course were immensely popular. Betty, the smaller female, succumbed to pneumonia in the early autumn of 1948 but even she had far surpassed any reasonable expectation. Cecil, the male and Penelope, the surviving female, remained in robust health.

The situation now began to present a serious problem of maintenance, since the cost of prodigious quantities of earthworms, crayfish and frogs is considerable. In the spring of 1949, we initiated a policy of charging five cents to view the Platypuses and continued it in 1950. Even this did not entirely defray the upkeep cost but the outlay was considerably reduced.

After four summers of exhibition, it seemed fairly evident that something should be done about breeding. Here we were with a true pair of mammals of unique rarity, which had been seen by many thousands of our visitors. The next step was obvious.

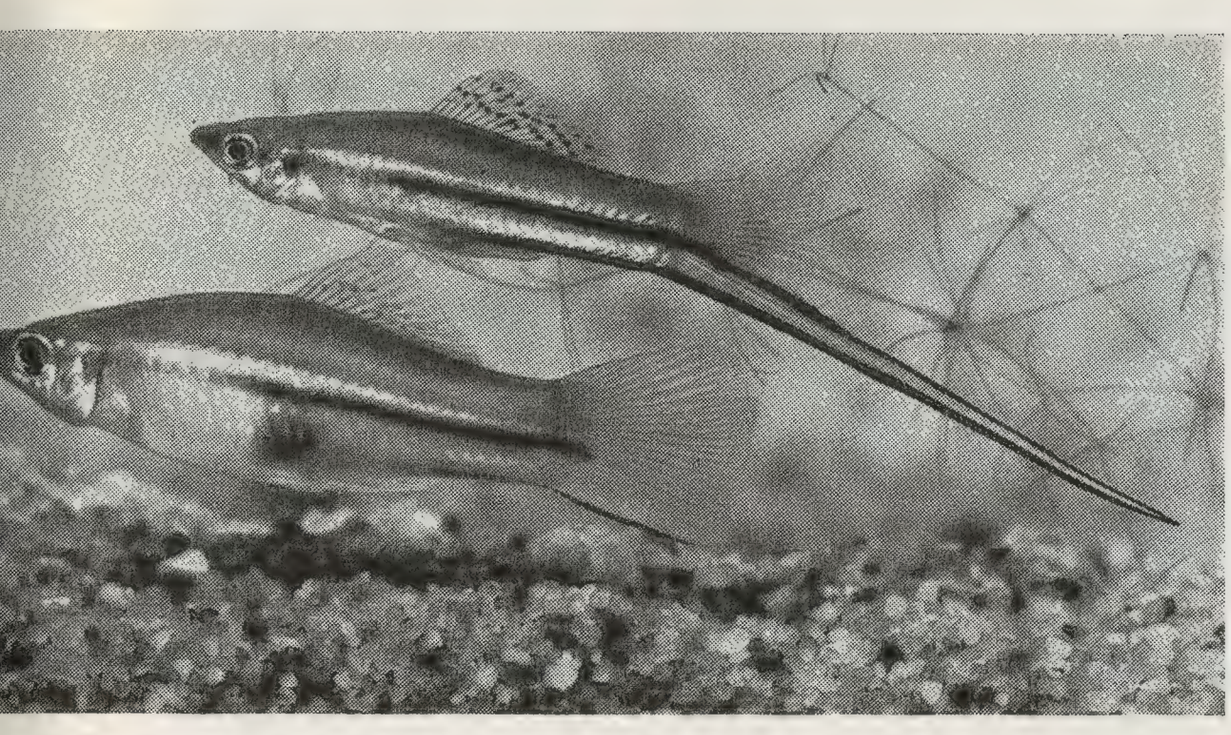
John Blair, devoted Keeper of the Platypuses, had been successful during the winter of 1950-1, in introducing the animals to each other in their quarters in the basement of the Large Bird House. When spring came, we resolved to write off the cost and give the pair the necessary seclusion during the summer by keeping the Platypusary closed to the public.

There were many points to be considered. David Fleay is authority for the statement that in Victoria, native State of Cecil and Penelope, the breeding season is September and October. The molt occurs in January and February, four to five months later. Had our animals reversed their seasons, so that pairing would take place in May or June? Such a change was essential for success, as the change to indoor quarters must take place in October, to avoid the deep cold of winter.

The weather in the spring of 1951 was unusually cool, so that we could not risk putting the Platypuses out of doors until May 13. Access to the earth mound at Penelope's end of the Platypusary was guarded by a baffle that only she could pass.

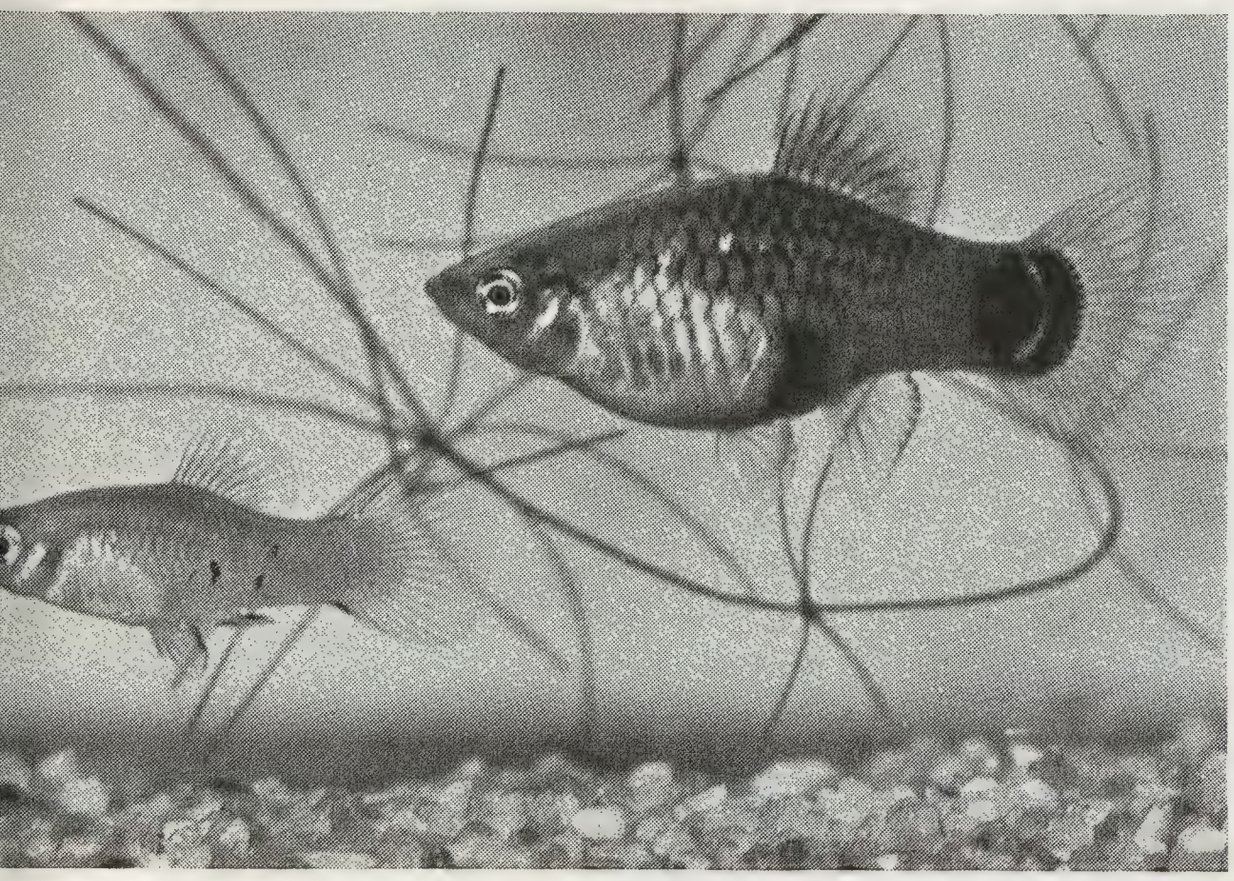
Night after night, John Blair observed the nocturnal movements of the animals. Penelope burrowed industriously and Cecil gave mild indications of pursuit, when opportunity offered. But there were no more definite indications and in August, both animals began their molt. It was then evident that there would be no increase in the family and on October 9, the platypuses were taken indoors.

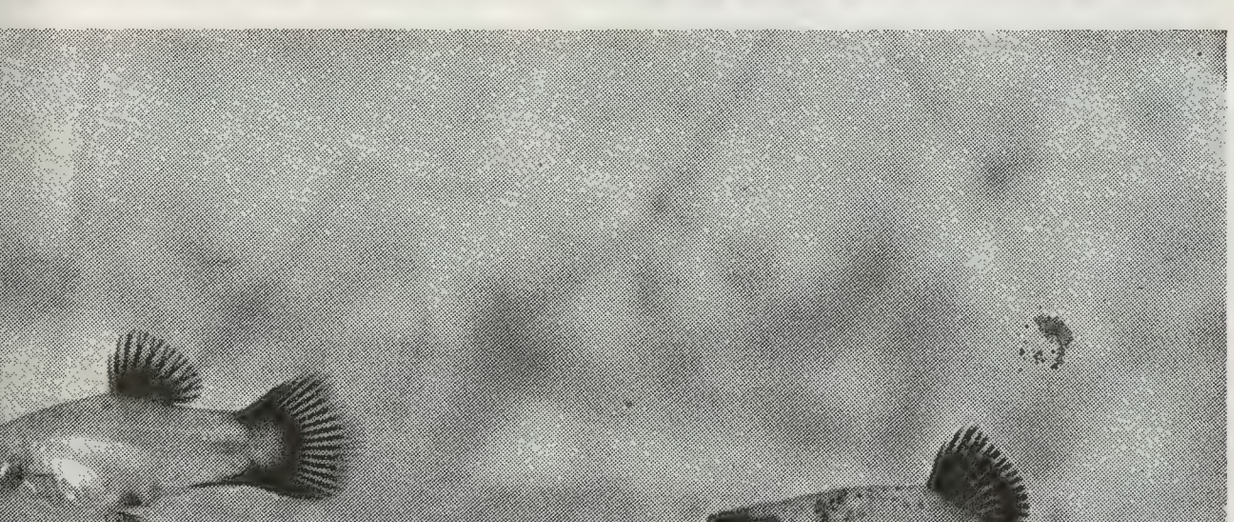
We are faced now with the remainder of our problem, which only time can solve. A molt in August should indicate the breeding time as April, based on David Fleay's dates, and assuming that the animals actually have reversed. Next year, we plan to follow the only possible proceeding: we shall hope that as a result of John's assiduous care our Platypuses will be in good condition at the approach of spring. Then, on the first warm day of April, out they go. By July first, we shall have the answer to our question. If it should be in the negative, our visitors for the balance of the summer can help us recoup something of the cost of our experiment.



UPPER—A wild Mexican Swordtail before Dr. Gordon gave it a beauty treatment in his genetics laboratory. LOWER—An example of a transformed fish.

TOP—This is the wild, gray-colored Platyfish as Dr. Gordon found it in Mexico. BOTTOM—Now called the Golden Wagtail, it is being sent back to Mexico.





A LOAN REPAID With Interest

By MYRON GORDON

FISHES born and bred in aquaria of the Genetics Laboratory in New York have been swimming in many strange and far-flung places, for it has constantly been our policy to make our stock of pedigreed fishes available to responsible people who have need of them.

Over the years our fishes have been displayed in the Steinhart Aquarium in San Francisco, serving to demonstrate to the public the influence of heredity in the development of pigmented cancers. Some were shipped to Whitman Laboratory of the University of Chicago for study of the early differentiation of sexuality. Several pedigree lines, some of them inbred brother-to-sister for ten generations, were forwarded to the University of Toronto for physiological studies. They required fishes of utmost similarity and purity. Psychologists at Brown University wanted to study the sexual behavior of fishes. They came to us and obtained our stocks of wild Platyfish and Swordtails for their research.

In a cooperative effort in the study of pigmented tumors, our fishes were transported to the National Cancer Institute at Bethesda, Maryland, and also to the Army Chemical Center at Edgewood Arsenal, Maryland. Next year we are planning to send some of them to the University of Istanbul in Turkey.

When, in 1941, as a by-product of our cancer investigations, a new color variety of the Mexican Platyfish, the Golden Wagtail, was developed in the Genetics Laboratory, it was made available to aquarists all over the world. Soon after it was

Large collections of wild Swordtails and Platys were seined from the little streams flowing into this river, the Rio Jaltepec in Veracruz.

released freely to tropical fish fanciers in New York and in London, the colorful Golden Wagtail Platyfish became the most popular fish of its kind – and it still is. Later, when the Bleeding Heart Platy was "invented," it, too, was sent to European aquarists where it is highly prized.

This year a fine collection of brilliantly colored Platyfish and Swordtails was flown successfully to Mexico City for Señor Jorge Delaye, president of the Aquarium Society of Mexico. All were born and bred in the Genetics Laboratory from stock originally obtained by our expeditions to Mexico in 1939 and 1948.

The Mexican Platyfishes and Swordtails that were returned to their native country resembled their wild ancestors only in their basic body contours. Their coloring and patterning had undergone a great transformation. The wild-caught fishes from the jungle streams differed in appearance from the New York City-bred ones as much as a woman in a Mother Hubbard differs from a model in a Jacques Fath creation.

Some of the gaily-costumed fishes sent back to Mexico had golden-colored bodies, trimmed with black, lace-like fins. Others had a somewhat reversed arrangement; their bodies were neatly covered with satin black and they had red backs and fins. A few Swordtails were decorated with subdued pastel shades of lightest yellow and had pink eyes. A few Platfyfish were pale, sheet-white, almost transparent and ghost-like. Still others were brightly colored all over: solid Chinese-red, including the pupils of their eyes.

Many of the Platyfishes and Swordtails, after taking their beauty treatments in the United States, had attained certain individuality and carried titles of distinction which were bestowed upon them by aquarists. Among them were the Golden Wagtails, Red Wagtails and Black and White Wagtails, Golden and Red Tuxedos, Bleeding Hearts, Black-bottoms, Leopards, Ghosts, and so on.

Sending our aquarium-reared fishes for serious biological studies and for public display in aquaria in this country and in Europe has given us great satisfaction. But returning Mexican fishes to their native country – in somewhat gaudier garb – has given us a special kind of pleasure.

We hope that Mexico, which had graciously permitted us to remove their native fishes to the United States, will welcome the return of some of them which we recast in more brilliant colors.

THIS IS HERBERT!

Photographs by SAM DUNTON

About Herbert

FEW ANIMALS are more engaging than a young Atlantic Walrus, and few are more impressive than a 3,000-pound adult, magnificently tusked and be-whiskered.

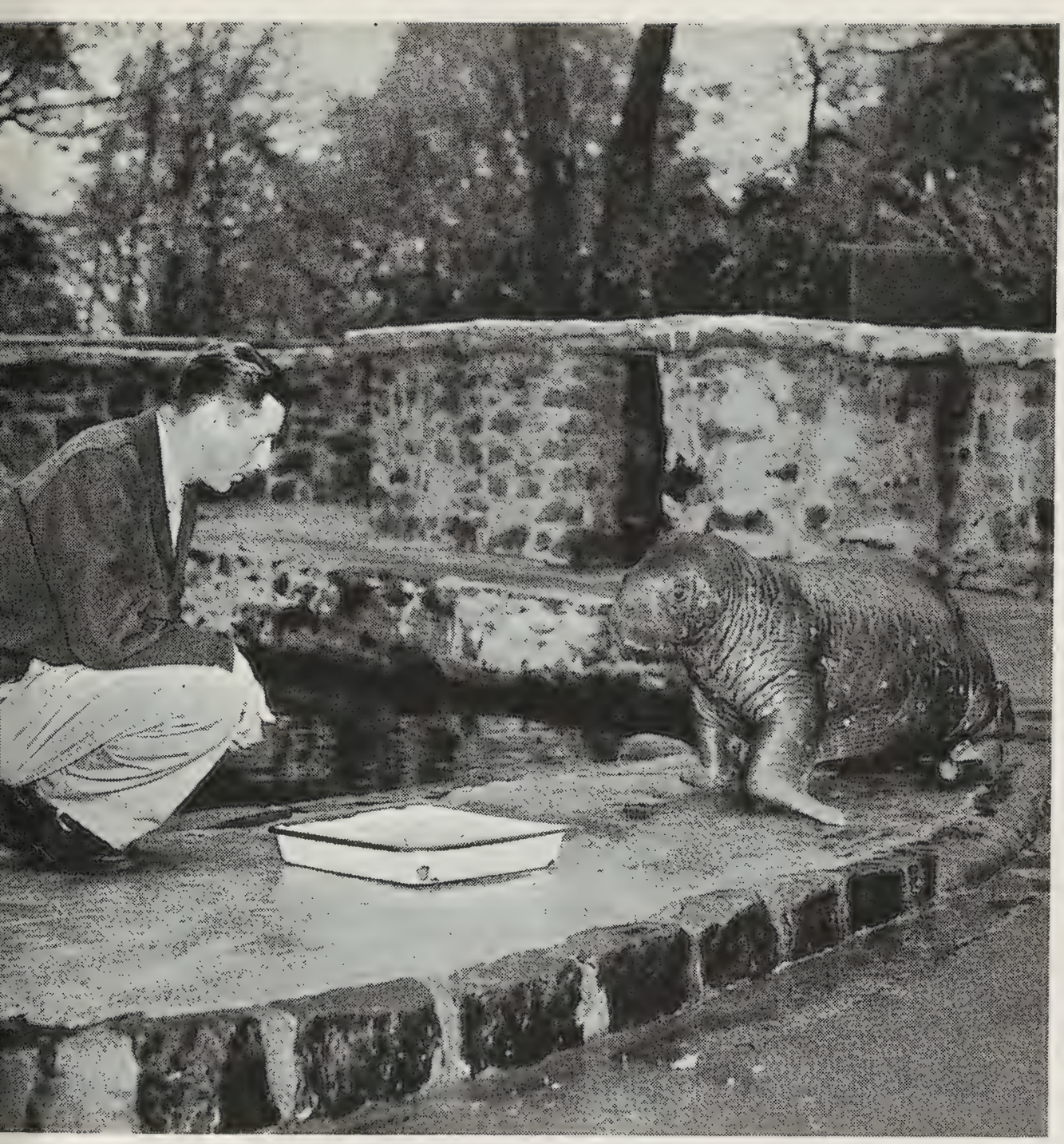
"Herbert" was born last May and was only six months old when he came to us on October 18 from an animal dealer in Denmark. Nevertheless, he weighed 240 pounds – a hefty baby indeed. A youngster in the Copenhagen Zoo, born in May of 1949, had attained a weight of 790 pounds on November 1 of this year.

Having been hand-reared, Herbert is friendly and affectionate, eager to follow his keeper around his pool with a shuffling, flopping gait. He shares the pool with two shy Harbor Seals that are, gradually, getting accustomed to him.

Herbert is always on the watch for Keeper Solanto and his pan of food.

Just for fun, Keeper Solanto put these steps in the enclosure and Herbert instantly got the idea and climbed up.

As soon as his r
Herbert heads fo

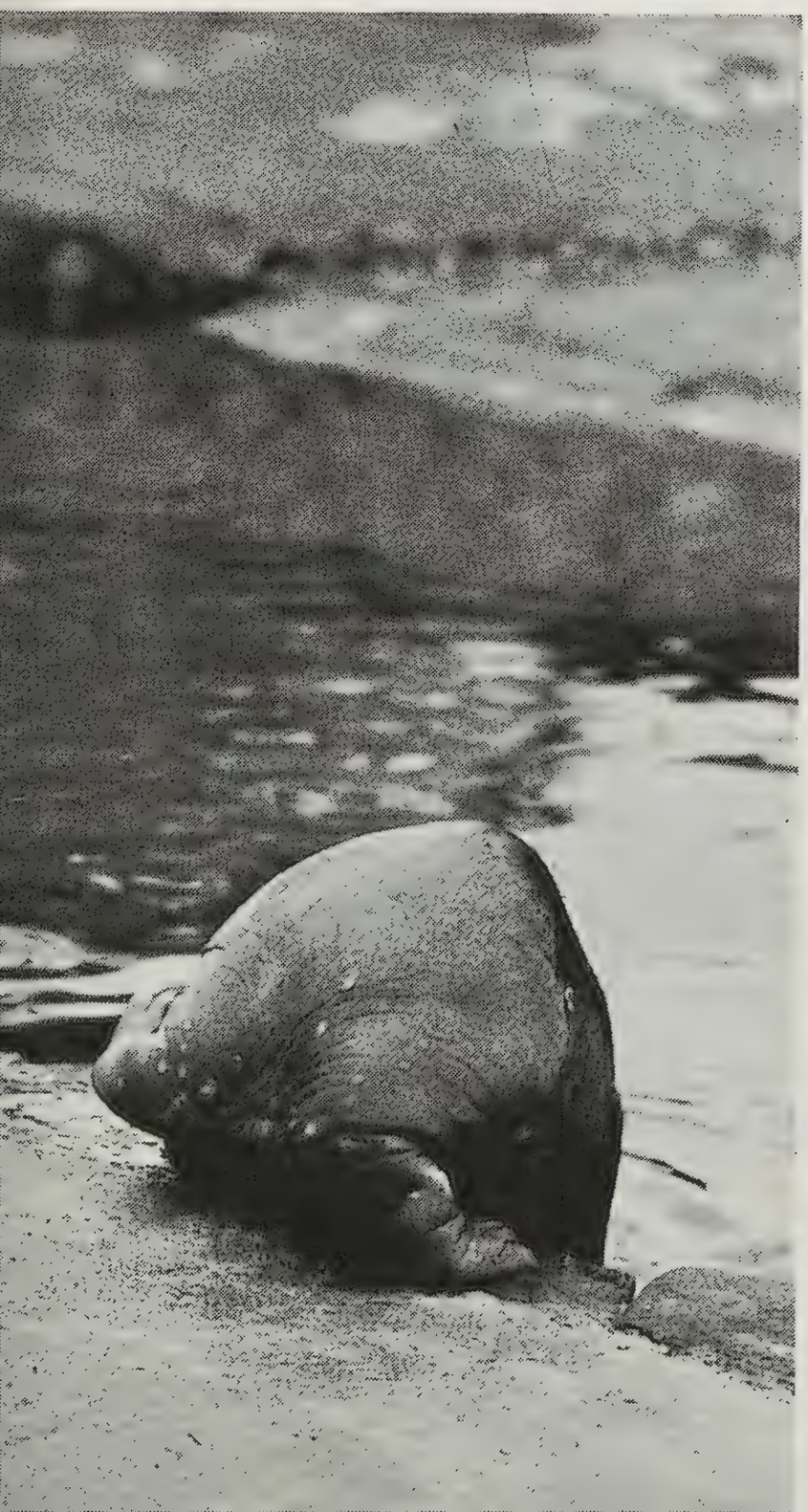


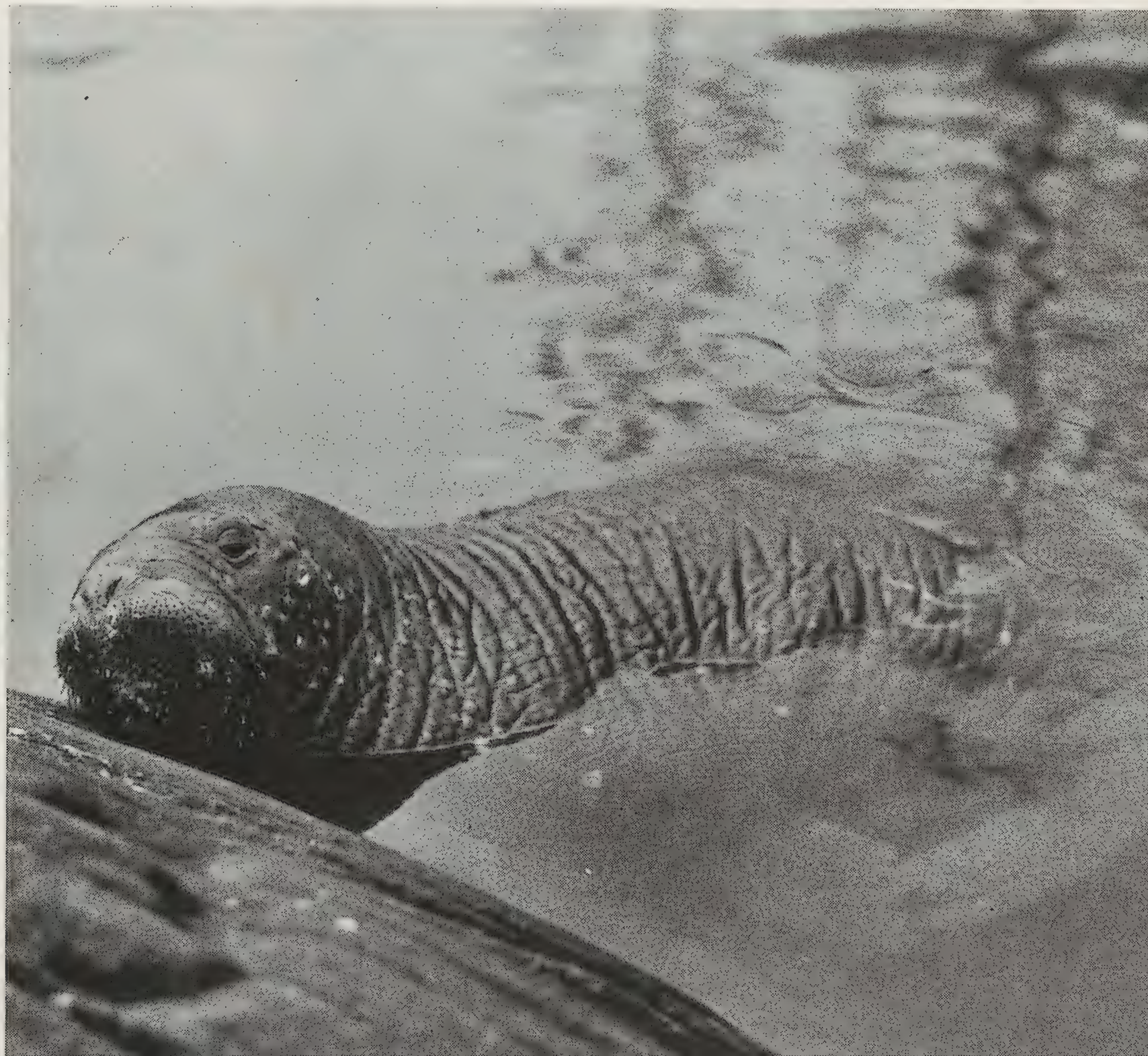
Scrambling ashore, he follows the keeper to the usual feeding place.

When he dips his muzzle in food, he seldom looks up until it vanishes.

fish and milk and oil is gone, ater to swim and dive placidly.

Often through the day he dozes for a few minutes, half out of the water. At night he sleeps in a shelter ashore.





Those "Forest Sprites" Called Marmosets

By LEE S. CRANDALL

LATE DURING THE PAST SUMMER we found ourselves in possession of what seemed to be a remarkable collection of marmosets, numbering eleven species. It was evident that an article must be written for ANIMAL KINGDOM in order to do proper honor to the group. A photographic project was laid out and space in the present issue was assigned. All was proceeding calmly when, on November 2, we found three marmosets in the hands of local animal dealers – each of a different species, and all new to us. With our series of marmosets thus increased to fourteen species, our undertaking assumed new importance.

Because of their delicacy in captivity, marmosets are not ordinarily kept in any numbers by Zoos. Up to 1950, only eight species had ever been exhibited here and seldom more than one or two at the same time.

In our case, at least, two factors have operated to keep our marmoset experience at a minimum: all but the best-known species have always been difficult to find, and suitable accommodations for these little forest sprites were not available.

During 1933 and 1934, a family of Golden Marmosets was maintained in the Reptile House before a window fitted with special glass at least partially permeable by ultra-violet rays. Here, under the direct supervision of Dr. Raymond L. Ditmars, the animals thrived and reared their young until the experiment came to an end through infections carried by visitors.

With the opening of our remodelled Small Mammal House in 1947, suitable exhibition quarters, providing the essential protection of glass fronts, became available for the first time in our history. Also, the quiet and seclusion of the Nursery room in the Lion House, presided over by Mrs. Helen Martini, gave a perfect environment for the necessary period of acclimatization.

It seems more than slightly curious that, just as our chief problem, lack of space, was resolved, the second obstacle – lack of supply – should suddenly disappear. It might seem that, because we were unable to house a real marmoset collection, we ignored opportunities to form one. But even though we are not always able to utilize opportunities to make additions, we do make every effort to know what is available. Good marmosets just weren't.

What seems really to have happened is one of the strange vagaries to which the animal market is subject. There is a demand for marmosets as pets, but this demand is principally for the white-tufted sorts—the Cotton-head and the Common. Obtainable numbers of these are inadequate to meet the demand, and it appears that hopeful shippers are combing the forested hinterland of the American tropics and producing rarities not hitherto available.

Unfortunately, these animals are most likely to be single specimens with which an Indian woman in some remote village has been persuaded to part. Glad as we are to find these individual representatives of rare forms, our new ambitions extend further. We want to breed them. In this direction we have already made some progress, Golden and Common Marmosets having been bred in the Small Mammal House, Cotton-heads in the Nursery. We are perfectly confident that if the enthusiasm of collectors should result in completing pairs of more species, we shall add to our list of breeding successes.

Doubtless general interest in marmosets arises from the fact that tiny and squirrel-like as they are, they still are members of the great Order of Primates. Found only in the American tropics, they form a Family that is the most primitive among the monkey tribes of the western hemisphere. Their distribution is wide, for they range from Costa Rica to southeastern Brazil, reaching their greatest concentration in the vast forests of the latter country.

Despite great variety in the obvious characters of color and markings and arrangement of hair, a considerable latitude in matters of size and demonstrable anatomical differences, the marmosets present very real difficulties for the systematist. So vast and inaccessible are the tropical jungles in which many marmosets make their homes that ranges and local relationships are not easily determined. In his "Review of the Primates," published in 1913, D. G. Elliot recognizes forty-two forms in five genera. In the "Historia Natural Ediar," published in 1940, Cabrera & Yepes reduce the forms to thirty-two but increase the genera to seven. At least until another equally scholarly revision appears, the latter work must stand as our authority.

Confusing as the scientific arrangement of the marmosets may seem, even the most obscure representative of the group could never be mistaken for anything else. Small size, alert action, tiny face with bright, beady eyes, mark the marmoset for what he is. In all of the known species, the long tail is non-prehensile, and as in all the monkeys of the New World, there are no cheek pouches.

In their remote jungle homes, the marmosets live almost altogether in the trees, seldom if ever coming to the ground. Small family groups search diligently for the fruits, insects and lizards that form their chief food supply. Unlike squirrels, the marmosets are inclined to keep to the comparative safety of fairly large branches, rather than risk the danger of more slender twigs.

The many great rivers of South America undoubtedly form impassable barriers to these rather weak and fragile creatures, accounting, perhaps, for the great multiplicity of distinct but closely related species. When our collector, Charles Cordier, was marooned for several weeks in 1950 on the Rio Napo in eastern Ecuador, he had ample opportunity to observe the local fauna. He found that the right bank of the river was inhabited by the lovely little Golden-mantled Marmoset, while on the opposite side only the Rio Napo Marmoset was to be found. Indians of the area confirmed his observations, further substantiated by tame, hand-reared specimens from each area. These, incidentally, are important units in our present collection.

One further peculiarity of the marmosets must be noted. Ordinarily two young are produced at a birth, although there may sometimes be only one or, very rarely, three. On the only occasion when Common Marmoset triplets were produced here, one of the three was so neglected that it failed to survive.

Baby marmosets are carried by the father, usually crosswise upon his back, and are ordinarily returned to the mother only for feeding. This arrangement is not always completely satisfactory to both parents and a certain amount of amicable squabbling is the inevitable result. The rearing of a young family is, of course, a most interesting proceeding and always has great fascination for our visitors.

Marmosets in the Collection
December, 1951

Common Marmoset – *Hapale jacchus* (Linnaeus)
Pigmy Marmoset – *Cebuella pygmaea* (Spix)
Black-tailed Marmoset – *Mico argentatus* (Linnaeus)
Imperial Marmoset – *Mystax imperator* (Goeldi)
Rio Napo Marmoset – *Mystax graellsi* (Espada)
Golden-mantled Marmoset – *Mystax tripartitus* (Milne-Edwards)
Buff-headed Marmoset – *Mystax fuscicollis* (Spix)
Red-handed Marmoset – *Mystax midas* (Linnaeus)
Pied Marmoset – *Mystax bicolor* (Spix)
Martins's Marmoset – *Mystax martinsi* (Thomas)
White-handed Marmoset – *Mystax leucopus* (Gunther)
Cotton-head Marmoset – *Oedipomidas oedipus* (Linnaeus)
Geoffroy's Marmoset – *Oedipomidas spixi* (Reichenbach)
Golden Marmoset – *Leontocebus rosalia* (Linnaeus)

THESE TWO ILLUSTRATIONS TRANSPOSED

PIGMY MARMOSET. The smallest marmoset, also the smallest New World Primate. An adult weighs about 4½ oz.; its body is approximately 6 inches long. Known only from the upper Amazon and its tributaries.

WHITE-HANDED MARMOSET. While it may not be one of the handsomest of the family, the White-handed does have the distinctions of rarity and comparatively large size. Its home is in northeastern Colombia.

GOLDEN MARMOSET. Loveliest of the marmosets is the Golden, with its long, soft hair of rich yellow. The heavy cape suggests a Lion's mane, hence the alternative name of "Lion Marmoset." The species seems to be confined to a comparatively small area in the vicinity of Rio de Janeiro in southeastern Brazil.

BLACK-TAILED MARMOSET. At first glance, the body of this animal appears to be pure white. However, it carries an infusion of pale gray over the back and sides. Its home is northern Brazil.

GEOFFROY'S MARMOSET. This is the most north-ranging of all the marmosets, its home extending from Colombia at least to Panama and possibly to Costa Rica. It looks very like a Cotton-head with its head-plume clipped.

IMPERIAL MARMOSET. (Above and Right). This is one of the rarest and most spectacular of the marmosets. The elegant mustachios have been figured and described as turning upward in the approved handle-bar fashion, but in our specimen they still droop. Its known range lies in western Brazil near the northern border of Bolivia.

COMMON MARMOSET. This family group includes a youngster born April 5, 1951. An attractive little marmoset, seen more frequently in captivity than any other. From the coastal zone of Brazil, from Belem to Bahia.

RED-HANDED MARMOSET. One of a group of rather large and dark-colored species, differing in details of coloration among themselves. The range of this fairly well-known form is in the Guianas.

BUFF-HEADED MARMOSET. This is one of our most recent acquisitions. The soft beige foreparts have a faint suggestion of pink, and the white forehead is sharply defined. It comes from western Brazil, near the borders of Peru.

Left to Right: **GOLDEN-MANTLED MARMOSET.** An especially handsome species. Obviously closely related to the Rio Napo Marmoset, it is distinguished by the rich, honey-colored cape covering its shoulders. Reported by Cordier to live on the right bank of the Rio Napo in eastern Ecuador. **MARTINS'S MARMOSET.** While it has the bare face of the Pied Marmoset, the dark brown pelage makes the contrast less striking. In both species the tail is dark above, light below. Known from the heavily forested area east of the Rio Negro in northern Brazil. **PIED MARMOSET.** The bare, black face against creamy foreparts give the Pied a bizarre appearance. It comes from western Brazil, in the area between the Rio Negro and Iquitos.

COTTON-HEAD MARMOSET. With the long, soft tuft that adorns its head and the bright white of its under-parts, it is no wonder the Cotton-head has been the most popular of the marmosets since a specimen was presented to Mme. de Pompadour by the naturalist Brisson in the Eighteenth Century. The Cotton-head is found in northern Colombia.

RIO NAPO MARMOSET. From the country of the Quichuas, in eastern Ecuador, comes the Rio Napo Marmoset. Charles Cordier reports it as living on the left bank of the river. The white lips are strongly contrasted with the black and mottled brown pelage.

News from the Conservation Foundation

Alaskan Resources Survey in Progress

As REPORTED in our September-October issue, the Alaska survey to be conducted by the Conservation Foundation staff under the sponsorship of the U. S. Department of the Interior is well under way, directed by Samuel H. Ordway, Jr. Mr. Ordway's article, briefing reports on Alaskan resources and originally entitled "Alaska Now!" has been accepted as a signed editorial to appear shortly in the *Saturday Evening Post*.

In connection with the Alaska survey, Robert G. Snider will fly to Fairbanks early in January to attend meetings of the Alaska Field Committee of the Department of the Interior and to interview representatives of other government agencies in the field. His stay will be of indeterminate length.

Littauer School Project Report

Six Fellows representing various Federal Conservation agencies are attending the Conservation Seminar at the Littauer School of Public Administration at Harvard University this term, according to the report of Dr. Ayers Brinser, director of the course. Since the Conservation Foundation has been principally responsible for the creation of this seminar, and has been able to provide the greater part of its financing, we are intensely interested in the progress made in this, its second year.

The first week of the current term was spent in the study of the Harvard Forest at Petersham, New Hampshire. The Foundation staff is of course deeply interested in the economic problems of forest conservation.

We have also been in receipt of a report recently prepared by the seminar's Committee of Land-Use on bills for taxation and regulation of Vermont forestry. The report contains a thorough review of constitutional law affecting state regulation of the use of private property.

American Forestry Association Meets in New Hampshire

A. William Smith of the Foundation staff was in New Hampshire the week of October 9 for the purpose of attending the meeting of the American Forestry Association at Jefferson. He reports that this convention was well attended by association members from all over the country as well as by New Hampshire conservationists and educators. Among others present was Mr. Randolph Pack, Foundation trustee.

Charts displayed by New Hampshire officials gave particular credit to the Conservation Foundation for supplying the facts on which they were based.

Massachusetts Asks for Help

In view of the planned reorganization of the State Conservation Department in the Commonwealth of Massachusetts, Conservation Commissioner Lyman suggested that the Conservation Foundation be called upon for assistance by the "Little Hoover Commission" which has the reorganization job in hand. The Executive Director of the Commission asked Messrs. Smith and Ordway to present a brief of the Foundation's views on policy and organization, which brief has been prepared and forwarded.

Miscellaneous Notes

President Fairfield Osborn addressed the Brandywine Valley Watershed Association at West Chester, Pennsylvania, on the evening of October 24, and on the previous evening he spoke to a student audience at Bryn Mawr College.

* * *

Robert G. Snider is conferring from time to time with the National Association of Manufacturers and Dale Doty, Assistant Secretary of the Interior, regarding a possible program for studying economic use of western ranch lands.

BEHIND THE SCENES

NEWS AND NOTES OF THE ZOOLOGICAL PARK, THE AQUARIUM AND THE DEPARTMENT OF TROPICAL RESEARCH

Society Sponsors Third Conference On Pigment Cell Growth

Under the sponsorship of the Zoological Society, the Third Conference on the Biology of Normal and Atypical Pigment Cell Growth was held at the Zoological Park on Thursday, Friday and Saturday, November 15-17. It was attended by 90 research men and women from many parts of the United States and from the Royal Cancer Hospital of London.

The first conference, in 1946, was held under the auspices of the New York Academy of Sciences. The second, in 1949, was sponsored by the New York Zoological Society. Papers presented at the third meeting will be published in book form in 1952 under the title of "Pigment Cell Growth."

President Osborn gave an address of welcome to the guests at the opening session. The conference was organized by Dr. Myron Gordon.

Concurrently with the pigment cell meeting, a series of sessions on Viruses as Causative Agents in Cancer was held by the New York Academy of Sciences at the Barbizon-Plaza Hotel, on November 17 and 18. Dr. Ross F. Nigrelli gave a paper on "Virus Tumors in Fish."

Cause of Death Not Determined for Our Giant Panda

Our Giant Panda, variously known as "Pan-dah" and "Susie," was found dead in the shallow pool of her out-of-doors enclosure on October 31, and although a most thorough autopsy is being made no clues to the cause of her death have yet been found. Reports of specialists in the diseases of certain organs are still to be made, however.

"Pan-dah" and a young male, "Pan-Dee," were captured in western China in the fall of 1941, when they were less than a year old. Executive Secretary John Tee-Van flew to China and brought the babies back as a gift of Mme. Chiang Kai-shek and Mme. H. H. Kung. Mr. Tee-Van and the pandas were at sea when war was declared and there were several anxious days at the Zoological Park until they arrived safely on the west coast.

Only two Giant Pandas are now known to be in captivity in the world, a male in the Brookfield Zoo in Chicago and a female in the St. Louis Zoo. Since the Giant Panda country is under Communist domination, it is unlikely that any more of the animals will be exported soon.

Five of Our Rungius Paintings Are Reproduced on Calendar

Five wild animal paintings by Carl Rungius have been chosen from the Zoological Society's collection for reproduction on the 1952 calendar of the Provident Mutual Life Insurance Company of Philadelphia.

From our gallery of thirty paintings by Mr. Rungius, the insurance company selected "Mountain Sheep," "Grizzly Bear," "White-tail Deer," "Cougar" and "Prong-horns." The sixth picture in the series is from a Rungius painting of a Moose, in the possession of a private collector. The reproductions are in color and are 12 x 9¾ inches in size.

General Curator Honored

General Curator Crandall was elected a Fellow of the American Ornithologists' Union at its autumn meeting in Montreal.

* * *

The re-designed and re-constructed moats on the exterior of the Great Apes House are virtually completed but cannot, because of the cold weather, be used until next spring.

For six weeks after it was given to us, the young Tern refused to eat unless someone held up bits of fish. That chore generally fell to Headkeeper George Scott, who eventually induced the bird to recognize bits of fish when offered in a pan.

It Was the Luckiest Tern of the 1951 Season

It is not unusual for lost and ailing birds to be brought to the Zoological Park for treatment or adoption, but we seldom learn anything of their past history. Occasionally a bird has been banded, and we may hear eventually how far it has wandered, but rarely anything else.

By an all-time record for coincidence, we do know much more about a young Common Tern that was brought to the Zoo on September 29, having been found, in a starving condition, on the roof of an apartment house across the street from the Zoological Park.

The bird had been banded. Routinely the band was removed and forwarded to the Fish and Wildlife Service in Washington. No report, incidentally, has yet come from Washington.

On October 13, however, it happened that Mr. Eric Kinsey, a California ornithologist, visited the Zoological Park and while he was being shown through the bird collection by General Curator Crandall, the young tern was casually pointed out to him and it was mentioned that the bird was evidently hand-reared, for it would take food only from the keeper's hand. Nothing more was said about it, for it seemed of little interest.

Mr. Kinsey continued his trip to the neighborhood of Boston, to call on a business associate. His friend, who is not an ornithologist, mentioned that a neighbor of his, Mr. Charles H. Gamage, treasurer of the Lynn, Mass., *Daily Evening Item,* had reared a young tern this past summer and that the bird had flown away some two or three weeks before; he wondered, since the bird had always been fed by hand, whether it would be able to find food for itself.

Remembering the young Common Tern in the Zoo, Mr. Kinsey remarked that he was sure Mr. Gamage's bird would be all right, because it was in the Bronx Zoo. There was no doubt in his mind that our tern was the same one, and he was not dissuaded when he was told that the Gamage bird had been banded before it flew away. The band had already been removed from the Zoo bird when Mr. Kinsey saw it, and the fact that it had been banded was not mentioned.

The likelihood that it was the same bird, and that a travelling California ornithologist should

happen to bring the two ends of the story together, so interested Mr. Gamage that he wrote to Headkeeper Scott to make inquiries.

His bird, he said, had been hatched from an egg that one of his children found on the beach at Isle of Shoals. The Gamages took the egg home, placed it near the pilot light on a gas stove in a strawberry box lined with toweling, and the egg hatched the following morning, on July 16.

They brought up the young tern on bits of fish and later in the summer banded it and attempted to turn it loose, even liberating it from a boat well offshore, in an area where other terns were flying. Invariably "Fish-fish," as they called the youngster, flew around a while and came back to the Gamages to be fed. It became such a pet that in mid-September it was featured on a television show in Boston.

On September 25, however, "Fish-fish" flew away and did not return, apparently having joined a flock of terns that were moving southward. Unable to recognize natural food and to catch fish for itself, it was able to fly only as far as New York. It happened to fall exhausted on a roof near the Zoo, and to be found by a young man interested enough to carry it to the Zoo.

Mr. Gamage took it for granted that Mr. Kinsey was correct in his report that the Zoo's bird, and his, were one and the same. Nevertheless, to make doubly sure, he sent the number of the leg band he had attached. The General Curator looked up his correspondence with the Fish and Wildlife Service.

Same number, all right.

The incident illustrates the all but inevitable tragic ending of wild birds hand-reared from infancy. "Fish-fish" was lucky, in that it ended up in the Zoo where it could be fed by hand; every year, probably thousands of birds are liberated by their human friends and are not so fortunate. Very often the nestlings would have perished if they had not been rescued, in the first place, but nine times out of ten the end is tragic anyway.

Sambar Twins Born

For the first time in our collection, twin Sambar Deer fawns were born on October 19. Any of the deer family may have twins, but few do except the White-tail, among which they are common.

Although the Sambar, coming from the foothills of India and the northern Himalayan region, are a hardy species, fawns born during the winter do not have a good chance of surviving. Coming so early in the fall, our twins should thrive, and so should a female born in September.

Our herd now contains three adult females and two males, in addition to the September-October fawns.

New Cafeteria was Opened on November 18

Bright and shining, modern in every respect, the Zoological Park's new Cafeteria was opened to the public on Sunday, November 18. It occupies the building in the center of the Zoo that has, for many years, been known as the Picnic Pavilion.

Little remains of the old structure, for it has been entirely redesigned inside and equipped with the most up-to-date service adjuncts. It will operate throughout the year.

* * *

Twenty-four Ecuadorean birds of 15 species, including nine we had never previously exhibited, have been acquired for the collection. They were captured by Charles Cordier, our former animal collector, who has been in Ecuador for several months. Among the prizes is a Sickle-billed Hummingbird, which we exhibited for the first time last year when Mr. Cordier brought it back.

Wedge-tailed Eagle

(*Continued from Page* 169)

yellow-brown than the rich golden-brown of the male. Her feet were bigger and more powerful and the irides of her eyes noticeably lighter—really greenish-gray when seen beside the gray of the male. The more showy, more vocal and more active male was definitely a lightweight, comparatively, although with some ideas, even at this stage, of threat behavior.

Horatia and her foster son now camped side by side at night at one end of the aviary, their shoulders almost touching, while the daughter perched away at a far end. The time was ripe

Those spines that cover the body of an European Hedgehog are just as sharp as they look. This adult specimen was presented to us by the Roosevelt Wildlife Sanctuary through the Audubon Society, and is now in the Nursery.

for the removal of the latter, so she was banded and sent to the aviaries of the Royal Zoological Society of South Australia in Adelaide. Measurements at the time of transfer showed her wing spread to be 6 feet 11 inches and her weight 11 pounds, which compared more than favorably with the 10 lbs. 5 ozs. of a quite large 15-years-old female also under observation. Evidently there had been nothing wrong with the upbringing of the young bird!

That Horatia, one-time hater of all her kind, has reverted to normal eagle behavior, is indicated by her continued affection for the young male. Particular interest attaches to a first-observed twenty-minute period of neck nibbling on June 24, 1951. In this instance the male perched nibbled gently at the base of her head and preened the feathers of her neck. Earnestly and affectionately the bird kept this up for some twenty minutes with Horatia patently enjoying such attention. She in turn nibbled the male appreciatively once or twice.

Horatia is now (July-August, 1951) more than ever territory-conscious, though the male is not yet old enough to have developed this characteristic seasonal trait. Occasionally in this winter of 1951 two wild Wedge-tails drift overhead, and one is never in doubt as to their presence, for fixing the "trespassers" with her bright eyes, Horatia screams piercingly while flying from end to end of her cage. In no uncertain terms she is telling the wheeling strangers that nowadays, given half a chance, she would soon sweep them from the skies.

Not so long ago she would have turned on any eagle, young or old, with ferocity. I was almost the only living thing for which she showed affection. But now, while I keep her confidence and trust, the golden-plumaged youngster is her accepted mate. The future holds most interesting possibilities.

PUBLICATIONS OF INTEREST

THE PHEASANTS OF THE WORLD. By Jean Delacour. Foreword by William Beebe. Thirty-two plates, one-half in color, from drawings by J. C. Harrison. Twenty-one maps and diagrams. Pp. 347. Pub. Country Life Ltd., London, and Charles Scribner's Sons, New York, 1951. $35.00.

The appearance of this attractive, authoritative and beautifully illustrated volume climaxes a series of elaborate publications devoted to the pheasants. The classical folios of R. G. Elliot, 1872, and the four-volume "Monograph of the Pheasants" by William Beebe, 1918-1922, are among the finest examples of the literary and illustrative arts of their respective epochs. Innumerable lesser efforts have filled the intervening gaps. The first paragraph of the Introduction of this newest tribute to a magnificent group of birds is fully explanatory of the inspiration that lies behind these elaborate productions:

"Pheasants have long been among the most popular of birds. They are large in size and beautiful in shape and in colour, thus having the highest ornamental value. The ease with which they have been kept and reared in aviaries and parks, as well as their excellence for sport and table, are paralleled in few other groups of the animal kingdom. It must also be remembered that one of them, the Junglefowl, is the ancestor of domestic poultry, perhaps the most useful of man's auxiliaries."

In 1872, when Elliot's great monograph appeared, the pheasants were considered to be exotic creatures of beauty, to be admired on a level with Hummingbirds and Birds of Paradise but never to be viewed in life. By 1918, when the first of Beebe's four magnificent volumes was published, the culture of pheasants in captivity was already well advanced and many fine species had been imported. Under the influence of Beebe's work, giant strides were made. Most of the known forms reached the hands of breeders and an extensive list has now become firmly established.

During the intervening years, much work has been done in modernizing the classification of the pheasants and many new forms have been described. An authoritative work that would put this information into usable form was urgently needed and no naturalist is as well equipped as Jean Delacour to provide it. Forty years devoted to the practical culture of pheasants, interspersed with numerous field expeditions and a thorough knowledge of museum material, find their fruition in this handsome volume.

While Elliot's work was largely descriptive, Beebe devoted much attention to fascinating accounts of "the bird in its haunts." Delacour emphasizes systematics and culture in captivity, the two points of greatest inter-

est to present day followers of the cult of the pheasant.

The illustrations by J. C. Harrison are beautifully done and superbly reproduced. Present day cost restrictions have put six birds on a plate, in most cases, and the elaborate full page paintings of the past are missing. Nothing of real value, however, appears to have been lost.

With pheasants in the wild exposed to the turmoil existing throughout most of their native territories in the East, it seems almost certain that in the future many, like Père David's Deer, will be known only in captivity. As a stimulus to those interested in the survival of these superb birds, "The Pheasants of the World" is extremely timely. – L. S. C.

ANIMALS. By Ylla, with an introduction by Julian Huxley. 146 pp., 100 photographs in black and white. Hastings House, New York, 1951. $5.

In his introduction to this attractive volume, Julian Huxley says that Ylla is "the outstanding animal photographer." If he had added "in the field of interpretation of animals as art forms," few would disagree. These one hundred photographs, beautifully reproduced, are superb.

The bitter complaints of nature lovers, too often frustrated by the lack of identification of the subjects of frankly artistic photographs, will be stilled by a chart on the end papers at the back. Here, among exposure details and similar data, the identity of each animal can be discovered. A little trouble, perhaps, but worth it.

–L.S.C.

PRACTICE OF WILDLIFE CONSERVATION. By Leonard W. Wing. Numerous photographs, drawings, tables and charts. Pp. viii + 412. John Wiley & Sons, Inc., New York, 1951. $5.50.

A concise, tightly-written treatise on present day methods in the conservation of wildlife. Since it is intended primarily for use as a text-book by students at college level preparing for careers as professional game conservationists, the emphasis is on game mammals, birds and fish. However, under the influence of present trends, the treatment is broadly ecological, with consideration of forests, lakes and streams. Song birds and other non-game species are covered and there are chapters dealing with State and Federal controls and regulations. Lists of references at the end of each chapter will prove extremely useful.

A former student of the late Aldo Leopold, Dr. Wing has had extensive experience in teaching conservation since 1937. He is well qualified, therefore, to produce a text-book which will be widely used. – L.S.C.

WONDERS OF THE SEASHORE. By Jaquelyn Berrill. 69 pp. Illus. Dodd, Mead & Co., New York, 1951. $2.50.

There is no better spot to get acquainted with strange creatures than at the seashore. Here, where two worlds meet, can be seen more fundamentally different types of animals than in any other easily accessible place. This simply written and illustrated book describes examples of those kinds most likely to be of interest to children of eight or more. Mention is made of a few natural history facts in the life of each. The book is truly introductory and may be turned over to the child and used by him with little or no help from adults. – J.W.A.

AMERICAN WILDLIFE AND PLANTS. By Alexander C. Martin, Herbert S. Zim and Arnold L. Nelson. Pp. ix - 500, over 700 illustrations. Published by McGraw-Hill Book Co., Inc., New York, 1951. Price $7.50.

One of the most important aspects of the conservation of animal life is the reaction of native species to the encroachments of civilization. The ability to survive under rapidly changing conditions depends largely upon food supply. Since this stems, directly or indirectly, from some form of vegetation, exact information as to specific plants eaten by certain animals and detailed means for identifying these plants are essential to workers in the field.

The great volume of facts presented in "American Wildlife and Plants" is not entirely new, since much of the material came from the files of the Fish & Wildlife Service, but it is not only gathered here in a single volume but is collated so thoroughly that its usefulness is greatly enhanced.

The work is presented in three sections. Part I is largely historical and explanatory, Part II is devoted to specific food habits of mammals, birds, fish, reptiles and batrachians, and Part III covers the plants indicated as food sources. This treatment provides a cross reference that makes exact information readily available. The vast amount of informational material contained in this book will be of immeasurable service to working conservationists. – L.S.C.

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ANIMAL KINGDOM

Bulletin of the

New York

Zoological Society

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No Boundaries to Zoology

THE CHAIN OF CIRCUMSTANCES that produces an event often appears accidental, although when the event itself has taken place it seems the most natural thing in the world. Such is the case in our recent decision to extend greatly needed aid to zoologists in Europe.

A year ago we were totally unaware of the fact that highly advanced technical work, some of it breaking entirely new ground in biology, was being hampered by shortages of equipment, technical literature and research specimens that are taken for granted in American laboratories. Then, last summer, Miss Jocelyn Crane of our Department of Tropical Research attended a scientific conference in Europe and, in the course of post-conference visits to various laboratories, quite accidentally discovered surprising needs and shortages. As soon as we learned of them we decided to help and can do so effectively with relatively limited funds which, however, we hope will have far-reaching effects. One of the Charter purposes of our institution is to promote and advance zoological knowledge. Obviously such knowledge knows no national boundaries and consequently our institution is embarking on its own Point Four program of aid to European scientists, which a recent editorial in the New York Herald Tribune describes as "internationalism in the best sense." We believe this comment to be true and we intend to leave no stone unturned to justify it.

Fairfield Osborn

FEB 4 1952

Grand Tour — Zoological Style

By JOCELYN CRANE

The "Grand Tour — Zoological Style" that Miss Crane describes here has had an interesting and important sequel. The New York Zoological Society has appropriated a fund to set up its own "Point Four" program to aid, with specimens, apparatus, technical literature and the like, European zoologists working in fields similar to our own. — EDITOR.

ONE AFTERNOON last August the rush-hour traffic stopped short on a highway near Amsterdam. A tall Dutchman had climbed out of his car and was ambling across the road, waving his arms and yodeling, while the four of us left behind watched anxiously. Heads pushed out of other cars and people peered from an endless stream of bicycles. In a moment it happened: a huge flock of dark birds took off from the roadside field and soared away, all with a fine and sudden flash of white feathers. We in the car — two Turks, a Swede and an American — beamed; the Dutchman climbed back in; one of the Turks said "Thank-you-very-much" in accented English. And the good-humored traffic, without a single honk, proceeded.

loss Buldern in northwestern Germany is an ancient stle newly established as a laboratory for Professor enz's studies of animal behavior. Here the gate nds open — to new ideas as well as scientists.

A few moments before, our Turkish friend had joyfully recognized lapwings and murmured that he wished the birds were flying, because he always loved to see their snowy markings underneath. No sooner said than done — and Dutch hospitality had made one more graceful gesture to Holland's current assortment of international visitors.

It was quite an assortment. Some eight hundred of us were members of the Ninth International Congress of Entomology, belonging to thirty-seven nationalities and speaking twenty-nine languages. We had journeyed a total of more than one and one-third million miles to tell our fellow humans how things are with the insects in Calcutta and Helsinki, in Rio and practically everywhere else on earth. For a solid week we talked incessantly, with endless enthusiasm, about our favorite subjects. During the first reception I overheard an attractive French couple exchanging views in the crush: "Worthwhile? Oh, decidedly," said the woman, ". . . but they're so difficult to rear!" The only certainty was that she was *not* talking about the children.

Later on, Congress members could be seen, badges flying, pursuing bees and butterflies in traditional fashion, while some scrambled after beetles in misty Dutch bogs. And one day in Leiden even the most technical entomologists exclaimed delightedly at the sight of twenty of the very gayest local butterflies feeding on the purple blossoms of an eight-foot buddleia.

Nevertheless, the fact that our members were professional entomologists had little bearing on the value of most of the papers they read in the section meetings of the Congress. It was of secondary importance that the subjects of their research happened to be six-legged creatures with their skeletons on the outside. Actually, their main problems concerned the fundamental mys-

Professor Lorenz has made important observations on his pet wild geese. They swim across the lake when called, follow him on evening walks, signal their intention of flying off by the rhythm of their gabbling.

teries of living, the puzzles of physiology, psychology, genetics and so on that are fundamental to living beings and that are, even now, helping to solve our special human riddles.

For most of the members the trip meant a sacrifice, of money or time or peace of mind. Money was naturally the major worry. Some had been scrimping for months, and even then currency restrictions made it impossible for them to take enough out of their countries; only the hospitality of the generous Dutch enabled them to eat comfortably once they had arrived. One European professor had apparently lost the habit of wearing neckties in his part of the post-war world; yet, with a faultless sense of relative values, he had not only managed to finance his trip, but had scraped together the price of English lessons for a solid year. One day I watched his delight in reaping some of his rewards: he argued blissfully with his English and American peers on a fundamental point in optics. A Hindu was sorely worried about his small, sick son at home; but every morning he turned up in the sections, his black eyes snapping, and contributed eagerly to discussions on the control of insect pests.

Often discussions went on long after the meetings. Two Englishmen, both experts in their field, disagreed with forceful politeness on the amount of progress that has been made in isolating the causes of locust migration. After the chairman suggested that they finish the duel outside, they were discovered, two hours later, in the lunchroom, still cordially unconvinced, their numbers swollen by two voluble Danes and a Swede. Another day a Dutchman from Indonesia and I were comparing notes on the things that rile a mantis in Java and Trinidad; suddenly we found ourselves going twice around in a hotel's revolving door, to the benign amusement of our blocked fellow guests.

Always there was the urge to tell and to share, in spite of all language difficulties. In the section meetings the linguistic atmosphere was permeated with an international kindliness which the United Nations would doubtless envy. (But then, no Russians turned up at our Congress.) One morning, an English-speaking Israeli, after a fine paper on an apparatus for recording insect activity, was asked to answer a question in French. The Israeli did his best, but finally broke down, laughed and asked his entirely sympathetic audience: "But how *does* one say 'wiggle'?" Whereupon the crowd cheered and obliged with three synonyms, all supremely Gallic.

Thanks largely to the hard-working talents of our Dutch hosts and the intelligence and experience of the organizing committee, language difficulties in our local tower of Babel were reduced from a menace to a nuisance. Three languages, English, French and German, were designated as official; the rest of the twenty-nine were relegated to the informality of excursions, meals and nightclubs. Everywhere the multilinguistic Dutch and Scandinavians oiled the wheels. In my hotel room hung the ubiquitous sign concerning the safe-keeping of valuables. *This* sign, however, was in five languages, the fifth being Esperanto. For most of the week I did not realize that even these northern Europeans were linguistically human, so easily did they guide us through to international understanding. Then one day I surprised a respected Scandinavian biologist, feminine gender, in a restaurant powder room. Her shoes were off and her feet were up and her eyes were closed. "How I love these congresses!" she sighed when she woke up, "But how *good* it will feel next week to talk only one language!"

One point kept recurring in every language and all sections: "I don't know." "Beyond that we have not gone." *"Je ne sais pas." "Ich weiss nicht."* It could not be otherwise when so many were pushing out on the very frontiers of biology.

And yet, there was always a feeling of a kind of limited irresponsibility – a feeling of being back in school. The Congress meetings were all held in the Tropical Institute and nearby school buildings, in a special residential section of Amsterdam, temptingly near the Zoo. There were trees about, an especially attractive canal, lawns and, of course, flowers everywhere. Even the lampposts had necklaces, high up, of frivolous pink and red geraniums.

Our responsibilities, in this particular school, consisted chiefly in getting to meetings on time. On mornings after late parties we hurried along in the brisk air, sprinted up steps and slid triumphantly into our classroom chairs just as a bell rang and the door closed. Then the speaker laid out his notes, fished a large gold watch from his pocket, laid it firmly on the desk, and everybody

Professor Karl von Frisch at his summer home near Salzburg. Here he has performed his famous experiments on the senses and behavior of honey-bees. In winter he is professor of zoology at the University of Munich.

Bees are daubed with paint so their "dancing" may be watched on their return to the hive. By their actions and odor, the scouts signal the direction, approximate distance and type of food they have located on their forays from the hive.

This apparatus is used for observing polarization patterns of sky light analagous to those employed by scouting bees. This ability is based on the structure of the bees' compound eyes.

The old pink house of Jean Henri Fabre at Serignan. In it he wrote his "Souvenirs Entomologiques," surrounded by the creatures dear to his heart. One of his sons still lives here.

sat up and looked intelligent. Soon chalk squeaked on the blackboard in the same key youngsters hear the world over, from kindergarten to calculus. Finally, often enough, out came a new idea that would probably not turn up in an orthodox classroom for ten or a hundred years.

This feeling of being a privileged student persisted throughout the three weeks I spent on the continent at the close of the Congress. It was a gypsy trail, going from one laboratory to another – nineteen of them in all – seeing at first hand the work of scientists from Vienna to Madrid. With some of these we had exchanged letters and publications for years, although we had never had the fun of talking face to face. Others we had never heard of, but now knowledge of themselves and their work has enriched our own studies immensely. Here it is impossible, of course, to tell of all the heart-warming kindness I was shown, as a member of a fellow scientific institution from across the sea. Also there is no space to describe the fine work going forward in the laboratories, all too often under staggering economic difficulties. Perhaps a few words about one or two will give an idea of the spirit of them all.

In the green, flat country of north Germany, near the bombed city of Munster, Professor Konrad Lorenz has just set up a new laboratory. Devoted to the comparative study of animal behavior, it is a continuation of his famous old one at his home in a section of Austria which is now in the Russian zone. For a modern laboratory doing top-grade research, the new setting is fantastically inappropriate. It is a moat-bound castle in an idyllic patch of woods and fields. Over the drawbridge you pass under an ancient arch and cross a medieval courtyard. Then come broad lawns leading down to a lake overhung with trees. Geese make rural noises. You wander back to the schloss and learn that part of it dates from the early thirteen hundreds, while the "modern" building makes you think inevitably of the courts of German princelings back in the days of Mozart. In the drawingroom, the panelled walls and grandfather's clock must have looked out, night after night, on an audience all powdered and bewigged, their bright satins glowing in the light of candles as they listened to spinets and clavichords.

But it is only superficially that the schloss is an anachronism. The modern drawbridge is forever down, firmly fastened at both ends, a figurative welcome-mat both to visiting scientists and to advanced ideas. The tree-bordered lake, which, it seems, must have been there since the last glacier, was actually made in March after Lorenz and his staff moved in. They dammed a brook so that the waterfowl, important subjects of study, might have a fitting home. As for the rural geese: far from being mere domestic descendants of the Goose Girl's charges, they are wild Gray Lags and Snow Geese, hand-reared by the Professor, with whom they converse in understanding satisfac-

tion. The sunset walk of this group, avian and human, through the castle park is certainly one of the pleasantest sights in post-war Europe.

The greenhouse of other days now shelters no fragile blossoms; instead it holds rows of glass aquaria, the homes of fresh-water fishes which are the subject of work on social and aggressive behavior. And as for the drawing room: The grand-

father's clock must be having repeated shocks these days. On my first evening there it heard a lecture on alpha brain waves, animal and human, and the next on the relationships of reflexes and instincts. The enthusiastic discussions which followed, by that group of brilliant and highly articulate Austrians and Germans, were unforgettable, and I longed for a more adequate knowledge of their language.

Another stop was at the summer laboratory of Professor Karl von Frisch, of bee-lore fame, at his home in the hills near Salzburg. That day stands out particularly clear and bright. The bombed houses of the Rhineland, the glassless station vaults, the endless, inert piles of rubble, were for once all left behind. This part of Austria, with the music festival in its final gala days, was a holiday land. I drove through Salzburg in an open car behind a small, gray-haired gnome with short leather breeches and a feather in his hat, exactly like somebody out of "Up the airy mountain, Down the rocky glen." We passed ancient concert halls decked with flags, and a theatre announcing a performance that night of *"Die Lustige Witwe."* And then suddenly we were in the brilliance of the clear mountain sun and air, passing fields where the hay was just being gathered into stacks. In an hour we were in the lake country, the land of Professor von Frisch's bee work.

Here, in a big, story-book house that looks like anyone's dream of an Alpine chalet and that actually used to be an old mill, the von Frisch family and their bees pass the summer. We sat over tea and little delicious cakes in a garden full of bee-favored flowers. We talked of Austria, of friends in America and, of course, of the bees. Then the Professor and his daughter showed me what we had always wanted to see at first hand —his exact method of marking the bees for his experiments. His daughter spotted each insect with deft skill, using quick-drying paint of blue and yellow and red, while the bees, unbothered by the branding, fed from a dish of sugar water. Then, on a nearby slope, I saw the famous communications system of the hive at work, which the Professor has come to understand little by little through the years. In the glass-sided observation hive we could see the "round" and the "tail-wagging" dances by which home-coming forager bees indicate to their fellows the distance and direction of food.* Finally, he showed me the apparatus he

In this carefully preserved patch of wilderness behind the garden of the house at Serignan, M. Henri Fabre has kept intact one of his father's experimental patches, where he attracted burying bettles.

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* See Prof. von Frisch's recent book in English, "Bees" (Cornell University Press, 1950).

uses in studying the amazing ability of bees to orient themselves through the polarization of light, even when only a single small patch of blue sky is visible to them.

At one point, with a twinkle in his eye, the Professor apologized for a momentary lethargy in the dancing of a few of his pets. "I took some of them up that mountain yesterday," he said, "and perhaps they are a bit tired!" And he pointed to a vast cliff in the distance which is the scene of some of his as yet unpublished experiments – the latest in a beautiful series going back more than forty years.

In all the laboratories, outdoors and in, there was for me the feeling of being at home, in whatever country they happened to be. The smells, the sounds and the sights of labs the world over were there, as in our own in the Department of Tropical Research. There were the fumes of formaldehyde, alcohol, perhaps long-pickled lizards and sometimes a whiff of thyme; the good dankness of aquaria, their air-tubes gurgling; there was a desk in Utrecht, where a man I never saw had arranged his forceps and needles beside his microscope in precisely the same order as Dr. Beebe. Everywhere were familiar books and scientific periodicals, many of them the same as those on our own shelves, and sometimes they smelled of moldy leather, just as ours smell in the tropics.

Once, however, when I remarked on this moldy smell, with nostalgic thoughtlessness in the natural history museum in Vienna, my host promptly replaced my at-home feeling with quite another. Those books, he said, had just come up from the bomb-proof basement, where they had been stored during the last war. It wasn't very homelike, either, to look directly across the street from that famous old museum and see a Russian flag, bright as technicolor, flapping in unbelievable red reality against the sky.

There could have been no greater contrast than to fly in a day from war-scarred Vienna – which seemed courageous and resigned and doggedly progressive all at once – to irrepressibly exuberant southern France. Here, when you saw a ruin, you could be reasonably sure it was a comfortable thousand years old at the very least, with all the corners nicely rounded and the certainty that nobody, with the possible exception of resident bats, had lived there only seven or eight years ago. And people still did things – lots of things – just for fun. After central Europe it was wonderful.

It was in that spirit that I journeyed up near Avignon to see a natural history landmark I had always hoped to visit. This was the house of Jean Henri Fabre, at Serignan. At Orange, which was as close as the train went, there were only three taxis, and all were off on jobs. It was late afternoon and since I wanted to photograph before the light went, I started off walking the few kilometers, garrulously directed by the café owner and three customers, all with berets cocked at exactly the same angle. I had gone only several squares, however, when I heard a strong *"Hola!"* behind me. There was the café man, pedaling along on an elderly bicycle and telling me delightedly that a taxi had just returned. So I set off again in state, with a driver who looked like Maurice Chevalier and recommended *canard aux olives* at the local restaurant.

M. Fabre's house was most satisfying. It was

Beds of wild mint, a powerful attraction for butterflies, grow in the dry moat under the towers of the ancient city of Carcassonne.

a large, trim old stucco farmhouse, painted a soft pink, with floors of patterned tiles and Provençal furniture so very much at home that any collector would have been envious. There lived Fabre's son, a kindly man, generously built. Although his personal enthusiasm is for photography rather than nature, he loves and respects his father's work and keeps several rooms unchanged.

He has also taken good care of the famous *harmas,* the wasteland beyond the garden. We wandered through it, with its varied shrubs, trees and lowly plants beloved of insects, and an artificial pond contrasting with the carefully encouraged patch of *midi* desert. It was no wonder I saw more insects in that short half hour than in all my time in Europe. And it was especially satisfying to know that these were the very species — often, doubtless, the ever-so-great grandchildren — of the bees and wasps, the flies, butterflies and beetles which the old naturalist had coaxed to stay here so many years ago. His wasteland is still thriving. He would be very happy.

Altogether, I managed several more sentimental steps backward in natural-history time, sandwiching them between orthodox visits to busy laboratories in France and Spain. These side-trips gave a sense of the continuity of our scientific heritage which I had always longed to have. Fabre worked in the first days of the study of animal behavior as we know it today. Medieval Carcassonne, on the other hand, was much too busy worrying about attack to care seriously about recording animal life, except on coats-of-arms or perhaps as inspiration for some of the more fetching gargoyles. After all, that fabulous town was at its height in the days when not even scholars looked inside of horses' mouths. So it was not surprising that the ancient walls were as bare of natural history relics as the top of the Empire State. Nevertheless, on the afternoon of my visit, 103 cabbage butterflies jousted and courted right under the turrets of the castle itself, going crazy over a bed of wild mint. I hoped that their forebears were equally fond of mint, back when golden-haired princesses, besieged and bored, peeked through the archers' slots.

Going back still farther in time, I waded after shrimps and crabs on a lovely, lonesome beach in Spain, where Dali has a summer home. To me, the best part was that these were the kinds which Aristotle watched, down at the other end of the Mediterranean, some 2300 years ago. And, finally, I paid my respects to the first natural historians of them all, the Cro-Magnon artists in the cave at Altamira. Whatever the purpose of those vivid wild bulls in reds and buffs and blacks, it was surely true natural history; those long-ago painters had to observe their subjects with scientific precision to make them live as they do today on the ceilings of that ancient cavern.

Somehow, the glowing life of the fine old paintings seemed related to the energetic enthusiasm of the modern workers with whom I had talked. Both the observant, painting cavemen and the observant writing men of the laboratories show their high intelligence and their warm interest in the world about them. In this world, which has such great need of all kinds of intelligent people, it is heartening to see these present-day Europeans at work. For they care so much about the "whys" of life on this planet that they are doing a superb job in spite of economic troubles and an uncertain future.

Several attitudes of these people are very apparent. First, they have been through so much that they have learned to go ahead with their work, just as though a long and peaceful life were assured. (Nevertheless, their wives' eyes look bleak when you mention a war — any war at all.) Again, realistically, they set themselves research problems requiring more brains than equipment. Finally, they have no real hope of travel, for only a few of them can benefit by Fulbright and other grants, yet they long for face-to-face, vocal interchange with their professional peers.

The director of a Spanish laboratory was talking wistfully about America. When I hoped aloud that someday we might return his hospitality, he shrugged and smiled. "The Atlantic is so much wider for us than for you," was all he said then. Later, though, he confessed he went right on hoping that perhaps someday he might overcome that irritating spread of expensive ocean, since he wished so much to study some of our American research techniques. But—and here his long, pale, Castilian face lighted up like Christmas — *most* of all he wanted an afternoon with "those wonderful platypuses, that live in the *Zoo del Bronx.*"

By JAMES A. OLIVER

When you first view the picture on this page, your immediate reaction may take one of a number of forms. You may ask somewhat incredulously, "What is it? Animal? Vegetable? Or mineral?" You may inquire, as did one of our associates, "Is the picture right side up?" The answer to the query, "What is it?", is that it is the Matamatá Turtle, *Chelys fimbriata* (Schneider) of northeastern South America.

This turtle is one of the most interesting, unusual and bizarre reptiles in our collection. While it has the overall appearance of a nondescript, flattened, alga-covered rock, closer inspection reveals a jagged, oval shell, four fully webbed and clawed feet, a short tail, an enormous long neck and large head. The skin over most of the head, neck and body is covered with rugosities and fleshy projections.

The size of the legs and the tail seems appropriate to that of the shell, which may reach a maximum length of twelve to fourteen inches, but the neck and head appear to be incongruously large. The head is broadly triangular when viewed from above. Each corner of the triangle is formed by a large, fleshy projection: a broad flap above each ear and an elongate, fleshy nose. This odd appearance is enhanced by the fact that the small eyes are situated far forward on the head, in front of the mouth. The jaws are weak and the mouth opening is small in relation to the size of the head. Unlike most of the living turtles that have the jaws covered with a heavy, horny beak, this species has a fleshy border to the jaws and only a thin horny covering.

The relatively small mouth, large head and long, thick neck constitute an unusual combination of structural attributes. How does such a strange combination of characters function in

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meeting this animal's nutritional requirements? Since its appearance is so odd, it is not surprising to find that it has a somewhat different method of feeding than that employed by most aquatic turtles. Instead of snapping or biting its prey, the Matamatá generally draws its food into its mouth with sudden and powerful suction! This is accomplished by quickly opening the mouth and

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expanding the large muscular neck. This action, accompanied by a dull clucking sound that can be heard several feet away, draws a sizable quantity of water into the gullet. Any small organisms near the mouth at such a time are drawn in with the water. I have seen small pieces of chopped fish drawn into the mouth from a distance of three inches. Mahler, reporting on a captive specimen in Germany, states that two fairly large live fish may be drawn into the mouth at one time, both entering the mouth head first.

Several observers have reported that the fleshy projections around the head can be moved at will. Thus these have been thought to serve as lures to attract fish and other small aquatic animals close enough to be caught in the inrushing water when the mouth is opened. We placed several small fish in a tank with one of our specimens, hoping to observe this phenomenon. Although several of the fish were eaten, we saw no sign of any voluntary movement of these projections. They did move, however, with movements of the water. Many of the smaller projections appear to lack muscle completely. I am inclined to believe that, with the possible exception of the elongated nose, movement of the fleshly projections is not controlled voluntarily but depends upon movement of the water relative to the turtle. Such movement in a quietly resting animal still could serve to attract food organisms, primarily fish.

With the small fish in the tank the turtle remained motionless on the bottom, alertly following their motions with its eyes. When the fish approached the turtle, slight and stealthy stalking movements were noted. These movements of its head and neck caused the projections to move slowly and erratically.

The mechanism for suddenly opening the mouth and expanding the neck involves a large, well-developed hyoid apparatus and powerful musculature to move it — the reason for the thickness of the neck relative to the rest of the body. The hyoid apparatus is that group of bones which in our own bodies forms the attachment for the base of the tongue and that makes up our larynx or "Adam's apple." In most turtles these bones are small in relation to the size of the head, but in the Matamatá they are greatly enlarged, providing the framework for the great expansion of the neck. Occasionally this turtle lunges and snaps at food in the more orthodox turtle fashion, but the method of feeding described above is the one more frequently employed.

The Matamatá is an inhabitant of swamps,

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ponds and sluggish streams of northern South America, from the Andes east to the Guianas, southward throughout the Amazon Valley. Although it is still relatively rare, it has been known for a long time. Linnaeus, the founder of our system of scientific nomenclature, wrote about this animal in the middle of the Eighteenth Century. Basing his description on a specimen from Cayenne (French Guiana), he gave it the name of "Scorpion Turtle" because of a horny spine on the tip of the tail, which he thought was similar to the sting of the scorpion. In 1783, Schneider, a German student of turtles, pointed out that this name was inappropriate and that it had already been applied to other turtles. Therefore he called it the "Fringed Turtle" because of the numerous fleshy projections. Schneider's descriptive scientific name is the one by which the turtle is known today, but his vernacular name is no longer in use. The Amazonian name, Matamatá, is the most widely used and popular common name today. According to Santos, this common name is derived from the similarity between the rugosities of the shell and the bark of a native tree (*Ipecacuanha*) that is called the Matamatá.

The Matamatá belongs to the interesting group known as the "side-neck turtles," a descriptive designation based on the manner in which the head is withdrawn. Our turtles in the United States, like most of the species from other parts of the world, withdraw the head by retracting the neck into a vertical S-shape between the front legs. In contrast, the "side-necks" withdraw the head by drawing the entire neck horizontally across the front of the shell. Obviously such a method does not give as great protection to the head and neck as does the vertical method of withdrawal. The "side-neck turtles" occur today only in the continents of the southern hemisphere: Africa, Australia and South America. In past geological periods they were distributed more widely, being known as fossils from Asia, Europe and North America.

The Matamatá is hardy and long-lived in captivity. Although it is an excellent swimmer, it is lethargic and seldom moves rapidly through the water. It rarely comes out on land to bask. Our specimens have never shown the slightest tendency to bite or snap, tolerating all handling with apparent indifference. Characteristically they are usually seen lying quietly in the water until morsels of fish are tossed to them. Then they become alert and quickly suck in the food to the accompaniment of audible clucks. It is a life of leisure and plenty, and the Matamatá apparently requires very little more.

Resemblance of the Matamata to a flattened, alga-covered rock is not lessened when one sees the whole creature out of water, as here. Note the large mouth.

It Could Revolutionize
A Great Industry—

Fishing With Electricity

By WILLIAM BRIDGES

THAT AN ELECTRIC CURRENT can be used to attract, stun or kill fishes has been known for many years, but widespread practical application of the principle is not much more than a dozen years old. As far as man is concerned, that is; the Electric Eel has been living on what might be called "current income" for the last few million years.

In fact, *Electrophorus electricus* has held its own so long, and so well, in the freshwater streams of South America that we are wondering whether its technique might offer some practical suggestions to human fisheries experts who are experimenting with the process.

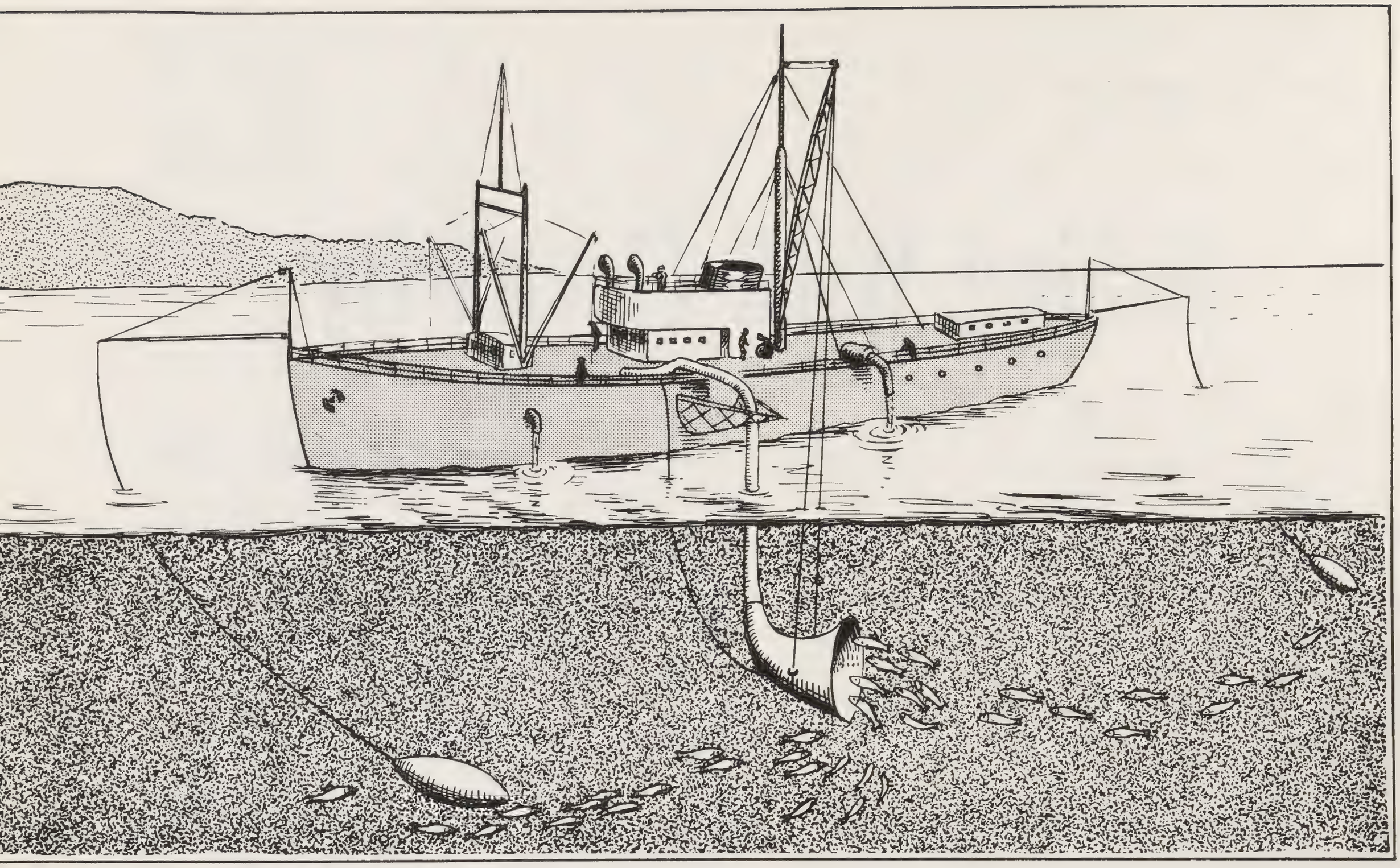
Curator-Aquarist Christopher W. Coates raised that question at the meeting of the American Fisheries Society in Rochester this fall and his comments on the form of the electrical discharge of the Electric Eel, and the results it obtains, caught the interest of experimenters. Reprints of technical papers on the electrical characteristics of the eel, many of which have been published in *Zoologica* in the past ten years, have been sent to American and Canadian research men to enable them to analyze the eel's type of dicharge.

There is still much to learn about the Electric Eel, but we know in general how it "works." While the eel is cruising in the roiled and muddy streams, it continually sends out a weak current that serves to find its prey. It is, essentially, a form of radar; the current goes out, strikes the moving prey, and bounces back to the eel. Sense organs in the head of the creature enable it to locate the direction of the prey, and the eel swims toward it. At some point it turns loose its major discharge that stuns and immobilizes the prey — without killing it. Oddly enough, the Electric Eel seems unwilling to eat fish that it has killed. Probably in the wild it seldom kills a fish by shock, although it has been known to do so in experimental tanks. This usually happens for the first day or two after an unfamiliar species of food fish has been introduced. The eel seems to need time to learn just how many discharges to emit in order to stun prey of a new size without killing it.

Precise measurements have been made in the Aquarium's laboratory by means of the cathode ray oscillograph of the form of the Electric Eel's discharge. Photographs have been made of the electronic line of light that represents the rise and fall and time duration of each discharge, and from the reports given at the Rochester meeting it appeared that the kind of discharge now being used in electric fishing by research workers differs significantly from the form of the eel's discharge. It is possible that the eel (to speak anthropomorphically) knows something the researchers don't.

Most of the work being done with electric fishing in this country, Canada and Sweden is, so far, of an experimental nature and is being done by fisheries biologists concerned with studies of fish populations. Both alternating and direct currents have been used, although direct current seems to be preferred. In part this is because of its polarizing effect, whereby the fish are drawn toward the positive electrode in the water.

Various types of generators and even dry-cell battery sources of electricity have been used. A typical method of electric fishing is to run a wire from the generator to a fixed electrode in the river,



From Fisheries Newsletter, Sydney, Australia

This is the way the Russians are said to be electrifying their fisheries. A suction pump draws the stunned fish into the ship, from which they are dispatched through a pipeline to a cannery on the nearby shore.

while the fisherman (his legs encased in rubber waders) carries a metal pole from which an insulated wire leads back to the generator. The mobile operator of the apparatus can thrust the pole into crevices among rocks and snags and seek out the fishes in their hiding places. As they approach the end of the pole, they are simply scooped up with a net or a seine.

The day is still far off when the country boy's willow pole and bent-pin hook will be replaced by a dry-cell battery and a coil of wire, but commercial applications of electric fishing may not be too far in the future. Experimental work on deep sea fishing by electricity is being done in Russia and Germany.

The German work, indeed, was reported on at length in Fishery Leaflet 348 of the U. S. Fish and Wildlife Service as far back as July, 1949. At that time an American Vice Consul in Bremerhaven outlined the claims being made by Dr. Konrad Kreutzer, a German physicist who became interested in the problem through his work on electro-shock apparatus during the war.

"Dr. Kreutzer reasoned that fish could be caught by placing two electrodes into the water and putting a varying positive voltage on one electrode," Vice Consul Robert B. Houston wrote. "The positive voltage on this electrode (the anode) would cause the fish to point towards it. The varying electric field along the spine of the fish would cause the tail muscles to contract and relax, moving the tail and propelling the fish into a net near the anode.

"Kreutzer is convinced that electro-fishing will prove itself not only because of its economy but also because it is the most conservative way of fishing yet developed. It is estimated that 90% of the fish brought up in nets of German trawlers at the present time are too small to be brought into port. Many of these undersized fish are dead when put back into the water. Electro-fishing, on the other hand, would enable the fisher to control the size and to some extent the type of fish

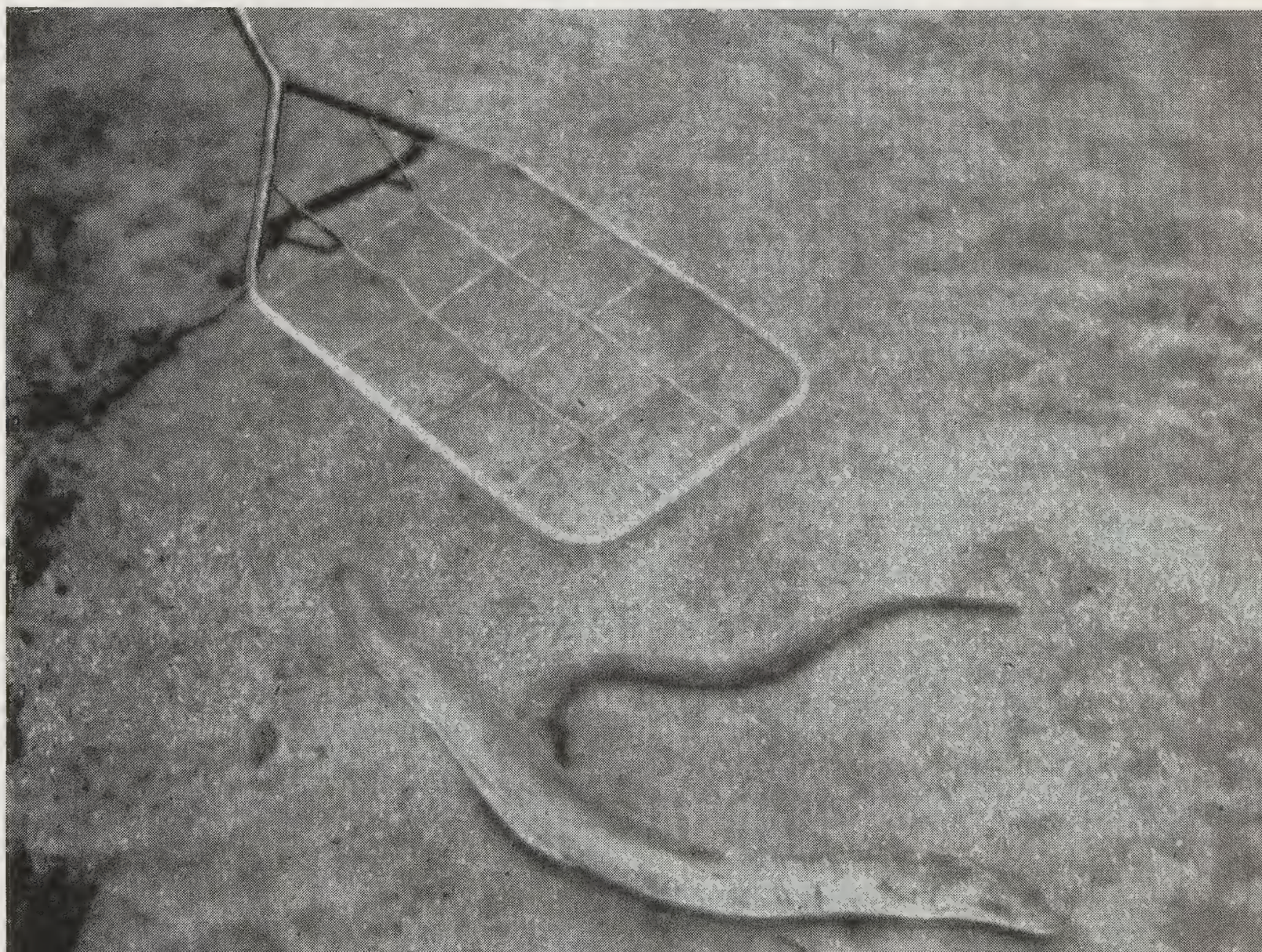
caught by regulating the pulse rate, potential gradient and net speed, which can be made so low that only those fish large enough to be affected by the electric field before they hear the net approaching will be prevented from escaping. The large fish which have been able to live for years by taking refuge under rocks when the net approched will no longer be able to escape as the electric field will reach down into the rocks and cause them to swim upwards into the net, which will be held a fixed distance off the bottom by an inclined plane and counterbalance arrangement.

"From the standpoint of conservation alone, Dr. Kreutzer believes the electric technic to be especially suited to whale fishing. He has had no opportunity to measure the reaction of whales to electric fields but envisages that a whale boat could be equipped with an electrode – instead of a harpoon–catapult. Upon shooting the electrode into the water near the whale, the pulse generator could be turned on. This would cause the whale to swim towards the electrode, and when sufficiently close to it, to lie stupefied on the surface. The whale boat could approach, measure the whale and then either kill it or free it depending upon its size. The whale presumably will not be harmed by being in a state of electronarcosis for this period of time."

The American Vice Consul remarked, most pertinently, that "Kreutzer's invention, if successful, will revolutionize commercial fishing."

Electric fishing in the Kavlinga River in Sweden, employing the apparatus developed by Philipp Wolf, a pioneer in this method. Stunned fish are captured by net.

Photo by Dr. C. J. Kerswill, Fisheries Research Board of Canada, Courtesy Canadian Fish Culturist.



Two live eels being held in the field of an electrode after removal from beneath nearby stones by means of the Wolf apparatus for electrical fishing.

Photo Swedish Salmon & Trout Assn.

It has always been known to the Zoolo
that children have an affinity for anima
and ice cream cones. It is even better
now after surviving our first Zoo Part
of members, at the Waldorf-Astoria on
Two hundred, more or less, were expec
was planned – but 950 came during t

Identification of the sounds made by ten animals was surprisingly accurate. One youngster not only recognized the voice of the Kookaburra, but knew how to induce our Zoo specimens to call.

It's just a common Duck from
of view, but to one of our gu
deal more than that. This s
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2 and 3.
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Dr. Oliver drew gasps from the audience when, after whetting appetites by producing a series of snakes each one larger than the last, he hauled a thirteen-foot Anaconda out of a zippered bag. It's as heavy as it looks — 50 lbs.

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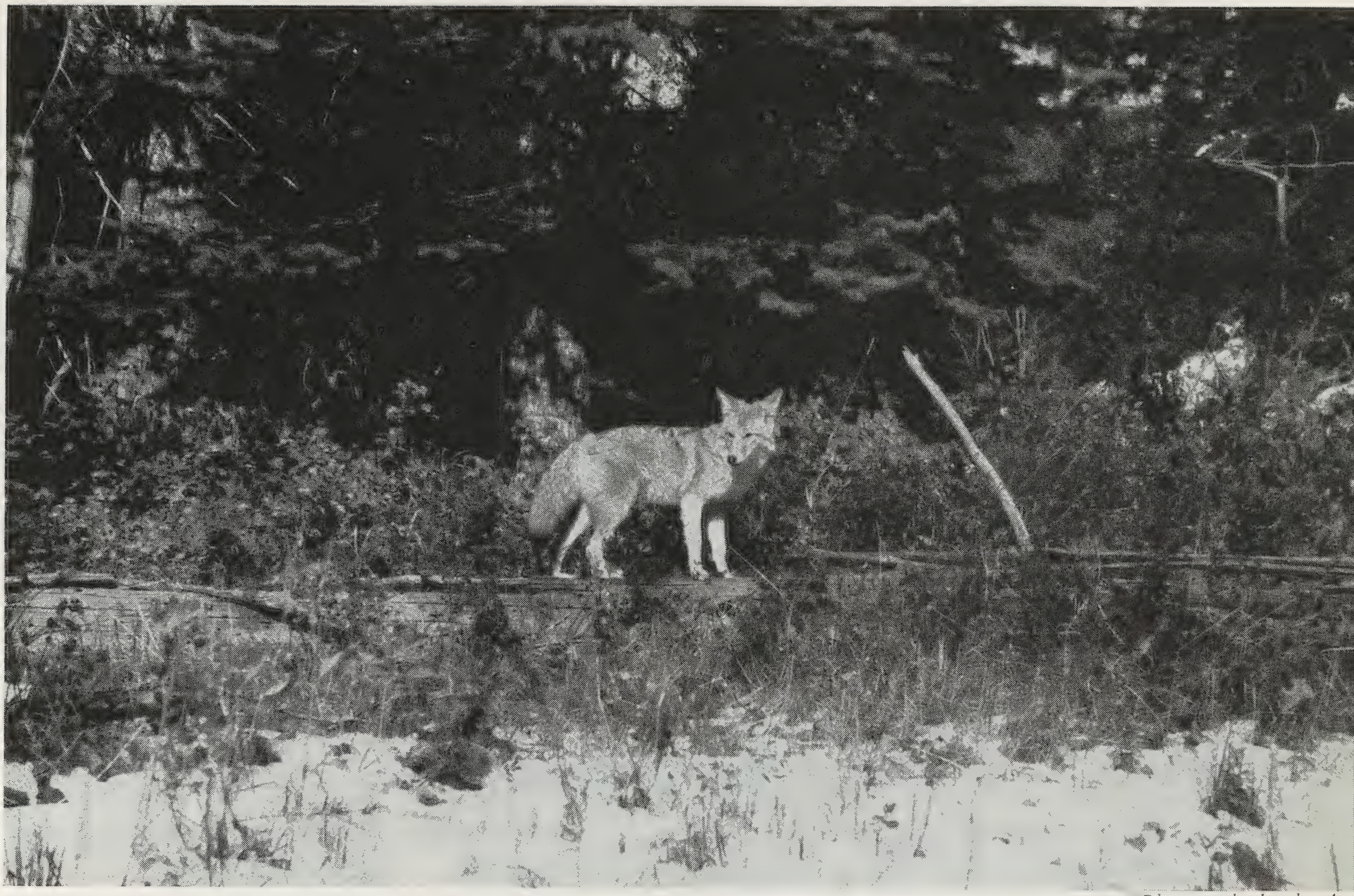
e parties.

Pinky, the most tractable of trio of pigs named Inky, Pink and Spot, allowed himself to b fed warm milk from a bottl

Nibbling pellets of food from an outstretched hand is an old story to Gretchen, the Angora goat that lives in the Children's Zoo.

A Coyote Friendship



Photographs by the Aut

By F. FRASER DARLING

FOR SOME OF US there is always an inner conflict as to whether we should keep wild animals as pets or not, and it is a difficult one to resolve. I have found some of the happiest moments of revelation of animal character in association with wild pets, yet tragedy is so often the end of these friendships that we wonder why we continue to make them. Are we being quite fair to these wild creatures in developing this new association which, when it is of the free kind, quite definitely gives happiness to them as well as to us?

There is this to be remembered: the sudden tragedies which occur in these friendships, and which we see to be so numerous, are certainly no commoner than they are in nature. The mortality of mammals and birds during the first winter is around 50 per cent. and sometimes much more. I do not think we are subjecting these friends to greater risks than they would meet in the wild state, but such a statement should not blind us to the responsibilities we assume when we take a young wild animal and rear it as one of the

family. These creatures are not to be tamed just for our temporary amusement.

If we look ahead a little, we shall not tame one of the large carnivores or an ape which, at the age of a year or two, we should have to turn over to a zoo. However kindly a Chimpanzee might be treated in a zoo, it could not lead the free and personal life which would be extended to it as a family pet. Nor should we tame a young male deer of any species, because such tame males are very dangerous after four years of age and quite unsuitable as pets.

Nevertheless, there is a host of creatures which tame easily, and so long as we can give them their complete freedom, they develop in character and we can learn much of animal behavior that is hidden from us when we are dependent on watching wild animals. How do Otters behave in their holt, for example? We simply do not know, but if we tame a couple of Otter kittens we see much of their playful private lives.

I once had a mouse, taken from the nest when a fortnight old, and I reared it on my person. This had some disadvantages, but they were not serious in the circumstances in which I was then placed. Squeakie taught me the brilliance of the murine personality. My clothing, with its multitude of warm pockets and runways such as jacket sleeves, was Squeakie's home. When I was moving about, she knew quite well to stay put, preferably in the breast pocket, which was an excellent look-out; she scarcely used that pocket at any other time. My home was one playground and my laboratory-*cum*-office was another, well known and regularly investigated, but at the slightest fright or when she was tired, Squeakie would find me. When motoring, she would sprawl luxuriously on my leg above the knee. Life was pretty good for both of us.

Last year, in Wyoming, in the aspen and spruce forests at the foot of the Grand Teton, I had another experience of a wild animal friend which moved me very deeply. Guri was a young bitch Coyote belonging to some dear friends with whom I stayed for a week. They lived in a house in the forest and Guri, who had been reared from a tiny puppy saved from the vermin-killer's spade, had complete and absolute freedom. My friends demanded nothing of her and imposed no restriction. She was a constant interest to me. How did she differ from a dog, how did the wildness show, how did she tackle particular problems?

In the daytime Guri gave her friendship to us of the house and teased an old, long-suffering dog just as any young one would; at night she was left outside and I think it is fairly certain she then made the acquaintance of the wild Coyotes in the district. We would hear their happy, yipping chorus very near the house. Would she eventually join them for longer periods and then perhaps for good? My friends were ready to let her make her own choice, and thus showed great wisdom.

One thing is certain: Guri was happy, and it showed in her little snippy-nosed, slant-eyed, Coyote face. I never saw her act in any mean or peevish way. She loved play and would invite you to come out for a rough and tumble, but she was much less dependent on the human being than the dog. There was none of that dog-devotion which is sometimes rather trying to endure, and she would often amuse herself in her own way.

I would go out each day alone into the forest, where nine inches of snow lay on the ground and bent the saplings over. Hosts of Red-breasted Thrushes (a Briton finds it hard to call them Robins!) flew through the trees, resting here awhile on their migration, and yet being constantly active and noisy. I would leave the house alone, but when I was perhaps two hundred yards away I was alone no longer; Guri would be there, silent among the trees, moving with lightsome step.

Here was no young dog that would exhaust itself exploring the excitements of the forest. Guri was silent of foot and of voice, quite extraordinarily observant, but making no fuss about her discoveries. Our journeys together were not hunting forays for Guri, but just what they were for me, quiet do-nothing walks when one would like to dispense with the body and be a mobile, receptive mind, seeing all. It seemed to me that Guri achieved this state much better than I.

She once stood with one paw against a sapling and looked across at me. I was sure she wanted me to see also, and when I looked up, there was a Porcupine near the top of the trunk, looking down indifferently at us. Guri stepped down on all-fours and wagged her tail gently. There was

no excitement, and no incitement to me from Guri to get the Porcupine down. I believe the Porcupine knew that, too. Again, Guri put up a covey of Grouse from the brush of a fallen tree, but she did not attempt to catch any. I was much interested in watching the Grouse; they were not unduly disturbed and they made no noise, but merely flew up into the branches of the nearest tree without that fuss which they so commonly make when upset. Here was a companion I could travel with in the woods. She had put up the Grouse because they happened to be in her path, but she showed only interest in watching them fly to their tree, not that silly, yapping, dancing excitement which a young dog of her age might have shown.

Sometimes I would sit on a fallen tree for a few minutes, to let come what might in the living pageant. Then Guri would some and sit between my legs, nuzzling my hands with her nose and expecting me to fondle her ears. But not for long. She would rise and move away as if I had not existed. No one ever had any strings on Guri. She was independent, belonging to herself only.

I liked to watch her catching mice and voles in the snow. Her body was then tightened up, the neck arched and the ears erect and far forward. There was a sudden jump, her forepaws coming down together and her muzzle following almost as quickly. She was adept at this and made a good proportion of catches. Our walks were much of a pattern, in the happy state of being alone and not alone, and at the end of my visit I knew more of Coyote behavior than I could have discovered in the wild in a year. But remember — she was a free, unenclosed creature, wild and yet not wild.

My friend and I examined many Coyote scats about the woods. They contained remains of service berries and of green herbage, of mice, rabbits and even Porcupines. The Coyotes were doing

When Guri pounced on mice or voles in the snow, she made a high percentage of captures.

their job as members of the necessary, conserving, predatory complex of the woods. Yet the minds and trigger-fingers of so many people are against the Coyote. Coyotes alone cannot control the rodents which could destroy the forest were they numerous enough, but the Coyotes are nevertheless guardians of woodland and range. The Coyote and man seem to be anything but good friends, though Professor Dobie's recent book recounts some interesting examples of a kindly tolerance and even sympathy between man and wild Coyotes.

Well, Guri was giving me something I would not forget, in those days in the forest below the Grand Teton. I left her and my friends with regret, continuing my long journey. Letters passed between my friends and me during the winter, but no word of Guri came. And because it did not come, I did not ask.

Further Adventures of Horatia

By DAVID FLEAY

In "A Wedge-tailed Eagle for Christmas" in the last issue of Animal Kingdom, *David Fleay, the Australian naturalist, recounted his adventures in capturing and rearing "Horatia," a magnificent specimen of her kind, in his aviaries at Badger Creek, Healesville, Victoria. The notes that follow concern Horatia's relations with free-flying Wedge-tails of the neighborhood, during the years when the captive bird was being trained in falconry.*

A pair of free living Wedge-tailed Eagles dwelling in the Badger Creek area and nesting somewhere on the slopes of heavily timbered Mt. Toolebewong were the means of providing notes of extraordinary interest during the earlier period of observations on Horatia and other captive birds of her kind, and particularly during July, August and September when seasonal jealousy over territorial rights is at its height.

Here is the account of an instance that recurred, with variations, several times between the years 1938 and 1947. Horatia was dressed as usual in leather anklets, hood and leash and carried from her "hangar" to the outskirts of a large paddock adjoining the reserve. There the big bird received her customary exercise and on this beautiful July day of blue sky and calm air she planed slowly in a wide circle three hundred feet up, until a rabbit which was dislodged from a bracken patch made a break for the line of timber. Immediately Horatia took on the sinister aspect of an attacking bomber and dived down in pursuit but "Bunny" just managed to reach the haven of the trees and scampered way with white tail flicking derisively.

Meantime prolonged cackling cries had arisen from the White-breasted Sea Eagles in the Sanctuary, followed by shriller rolling screams from Horatia's own kind in the aviaries. Kangaroos were motionless, gazing apprehensively skywards, and Cape Barren Geese grunted warningly. There, loftily suspended in the skies, and down from a height originally beyond the power of human vision, whence they had observed the free-flying Horatia, now appeared two eagles—the cause of all the excitement. They were the wild Wedge-tails inhabiting and "owning" the locality. Directly over Horatia, now flying slowly two hundred yards away, one of the visitors suddenly dropped like a stone with wings rigid and half closed. Down and down at incredible speed the attacking eagle dived until the actual scream of its pas-

sage through the air was an astounding sound. Then abruptly at the last possible moment, as it seemed the steel-muscled bird must at least crash the low-flying Horatia into the ground, crippled for life or even decapitated, the uneasy Horatia turned completely upside down, presenting formidable talons at the enemy. Immediately the attacker veered with perhaps six inches to spare and shot upwards in a whistling turn seemingly impossible, so close was it to earth. A scared Horatia showed no further inclination to take the air and appeared relieved to be hooded and carried home.

The aerial visitors resumed their effortless and majestic gliding on lofty air currents but with Horatia restored to her usual log perch within view they abandoned sedate flight and once again, directly above her, dived steeply towards earth one after the other until, only twice the height of the creekside eucalypts, they practically "stood" upon their tails and zoomed up and over in perfect loops—the wing covert patterns clearly visible as they turned.

The spectacular twenty-minute display of aerobatics that followed was obviously intended as intimidation tactics, for Horatia watched each move keenly though obviously without either appreciation or admiration. Beside loop sweeps there were stall turns or half rolls. The demonstration was accompanied the while by excited calling from Sea Eagles, the other Wedge-tails and even Whistling Eagles, while back and forth in the sky above stunted the visitors, now sailing towards earth at terrific speed right over Horatia, sweeping sharply up at a steep angle out of the power dive or straight over to loop once more.

Eventually the impressive display ended as the two eagles floated to more lofty regions and gradually faded from view. Not always did such breathtaking episodes occur and these, of course, only during the winter nesting season, but on occasions Horatia eyed the seemingly empty blue sky with intent gaze and "talked" excitedly and we knew that those far-seeing eyes had discerned these or other eagles beyond the range of our own limited vision.

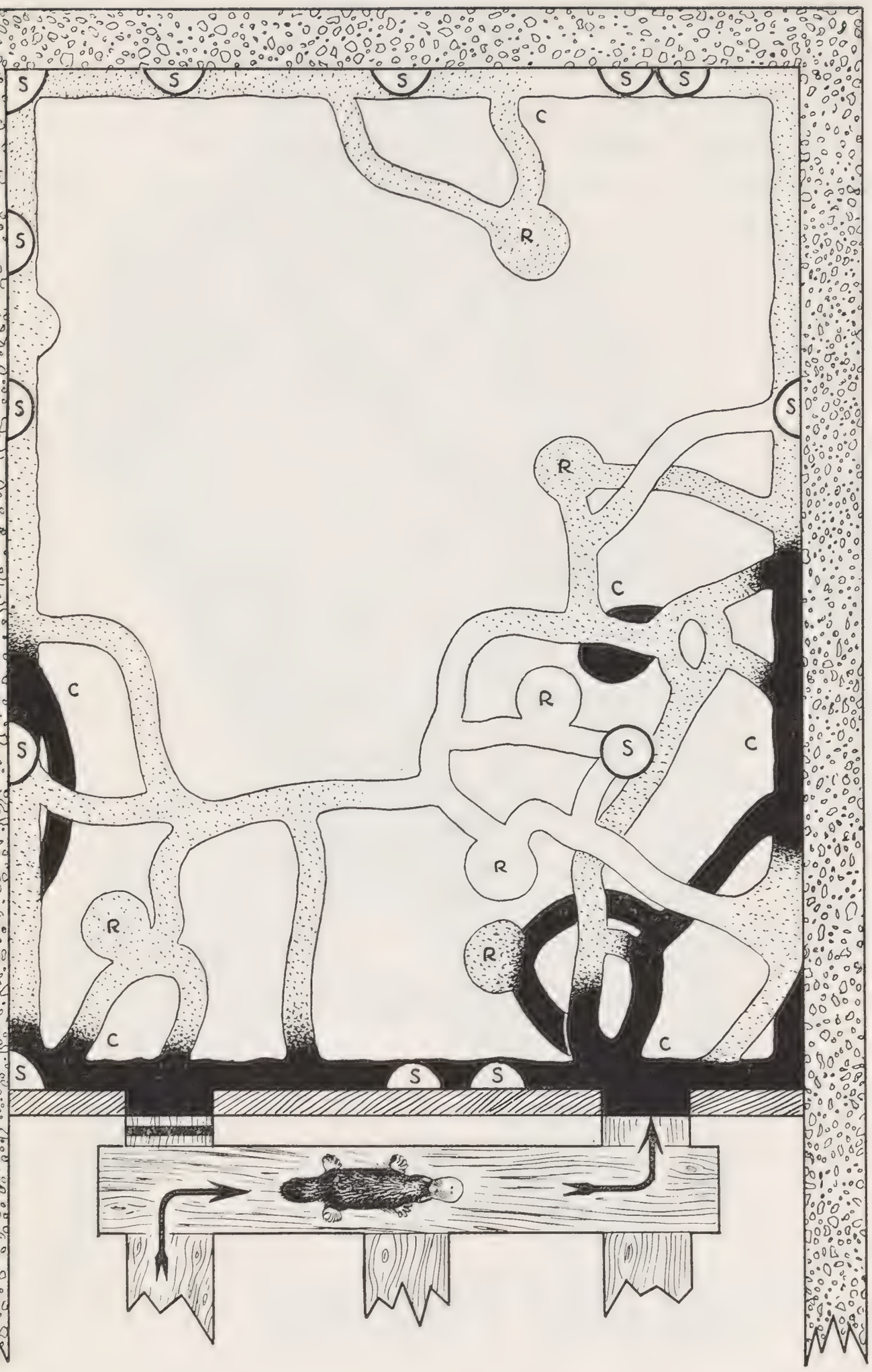
More Details on Cecil and Penelope

By JOHN BLAIR

THE STORY OF OUR PLANS for breeding the Duck-billed Platypus was told by General Curator Crandall in the last number of ANIMAL KINGDOM, but there are some additional details I would like to add.

As Mr. Crandall mentioned, it was not until May 13 that we were able to put the animals outdoors and about another week before they settled down after the change. On May 22 Penny was allowed into the mud bank at the end of her sleeping quarters and she lost no time getting to work on her burrow. Each morning for several days, the wooden burrow was filled with dirt that she had cast out as she progressed and each time a "Pug" was found at the entrance to the mud bank, sealing her into the newly-dug home. After about a week of this, suddenly no great amount of dislodged dirt was found and it became apparent that she was satisfied with the burrow.

The time had come to allow the two together. I removed the "window" in the center partition in the pool and prepared to watch for any signs of courting. Penelope came out at 9:30 P.M.



This is Keeper Blair's dissection of Penelope's burrow. White sections of the tunnel are 1 to 10 inches deep; dotted, 15 to 20 inches; black, 25 to 30 inches. The areas marked "S" are surface holes. "R" indicates hollows large enough to be called rooms. "C" indicates areas where dirt has collapsed from one level to another.

and, finding the window open, proceeded to explore the length and breadth of Cecil's pool, shelf and platform for almost an hour until Cecil came out of his burrow and almost immediately began chasing her all around the pool. Was this "play" or animosity? Neither paid any attention to the food before them and I watched them until almost midnight, not knowing whether the next moment might give evidence of friendliness or a fight. Finally, there was little doubt as to their intent. Penny was truly frightened, nervous and upset each time Cecil approached, so I separated them and replaced the window.

The following morning, three more panfuls of dirt were found in Penny's burrow, which I interpreted as evidence that she was digging again—which could be attributed to her nervous, frightened condition.

It seemed strange, indeed, to find them anything but friendly, since they had been so happy together in their winter quarters. Charging this off to the change of locale, I tried again and again every few nights but each time Penny repeated her rather casual explorations until Cecil came out and then immediately went on the defensive, splash-diving, turning somersaults, attempting to climb the vertical walls of the tank —anything to get away from him until I maneuvered each into the proper end of the pool and closed the window.

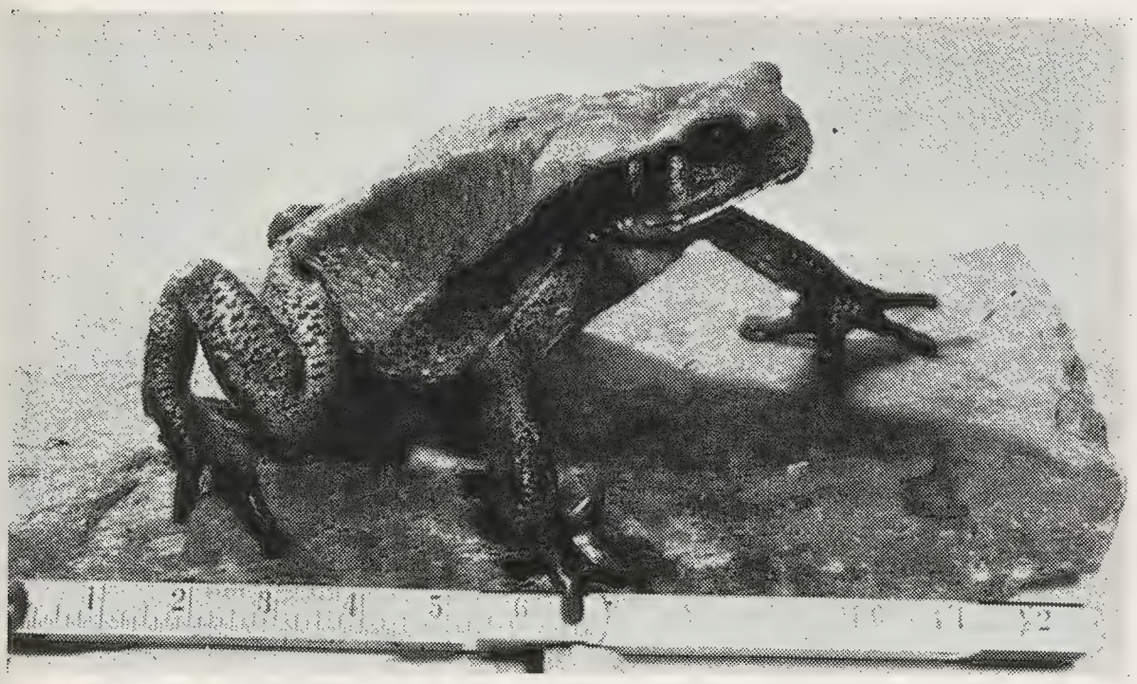
Late in July, with the molting season approaching, I discontinued allowing them together. Penelope had lost weight and was extremely nervous. Cecil was a bit less aggressive but still unfriendly.

By mid-August, both were shedding, just as they had done in each of the past seasons. Bits of discarded fur were noticed on the surface of the water each morning. Apparently we had missed the breeding period, since molting normally follows breeding by about three months. However, there was still a slight chance that they would mate in their native breeding months, so upon completion of their molting, I again allowed them together. Three attempts were made, but noting the same frightened reactions in Penelope I concluded that further attempts would be futile and perhaps dangerous.

After returning the animals to winter quarters once more, I opened the mud bank, trowelful by trowelful, to ascertain just what kind of a burrow Penny had made and what changes, if any, might have to be made by us before next spring. From the amount of dirt dislodged, I knew that the mud bank must be somewhat honeycombed with tunnels. The accompanying diagram illustrates how active she had been. The maze of tunnels that I found and the collapses of the dirt

were indeed interesting. Three distinct levels were found, all of which were connected by holes, purposely dug or resulting from collapses of the dirt between levels. Several "sleeping rooms" were found and a complete perimeter burrow showed that she had explored the boundaries of her confinement thoroughly. In several places she had dug herself to the surface of the mud bank, and it was interesting to note that in all but one instance these holes were on the perimeter. It is quite possible that the exception resulted from a collapse, since the burrow beneath it was only three inches below the surface. Except for a change in consistency of the dirt to a more clayish mixture, to guard against collapses, no major alterations in the mud bank would seem necessary.

Now that they are again in winter quarters we are hoping for a reconciliation before next spring, and if such occurs we may try again. With an early break in the weather, perhaps we will be able to put them outdoors early enough to learn definitely whether or not these strange creatures will mate and breed in our climate.



Our New Giant Toad Is a New Species

By JAMES A. OLIVER

In the July-August issue of Animal Kingdom we proudly displayed a picture of two of our new Colombian Giant Toads. We were elated to receive the three large and unusual specimens that arrived on July 5 from Rolf Blomberg in Ecuador. They had been collected in a remote and inaccessible section of southwestern Colombia, and it seemed likely that they had never before been exhibited alive.

Since July 5 we have learned a great deal more about our toads and how unusual they really are. In fact, they represent a species of toad new to science. Only now have they been classified and catalogued among the known animals of the world. In Volume 36, Part 4, of *Zoologica*, published on December 28, Dr. George S. Myers and Mr. John W. Funkhouser of Stanford University presented a scientific description of these toads and named them after their discoverer, Mr. Blomberg. Henceforth our Colombian Giant Toads will be known in scientific circles as *Bufo blombergi* Myers and Funkhouser.

As of this date, only four specimens of this new toad are known, and three of these are on exhibition in our Reptile House. The fourth specimen is preserved in the Stanford University Natural History Museum. The largest of the four individuals is one of our live specimens. Its head and body length of nine inches is as long as that of the largest toad known from anywhere in the Western Hemisphere, and is exceeded only by the 10¼ inches reported for an East Indian toad.

The Colombian Giant Toads were collected in the vicinity of Nachao, a small village in the Province of Nariño in southwestern Colombia. In order to get to Nachao to collect the frogs for us, Mr. Blomberg had to travel some ninety kilometers by mule. Our specimens were collected during the rainy season when the toads are said to be most common. Acccording to the reports of the natives of this region, there are still larger toads than the specimens collected by Mr. Blomberg. If these native reports are true, it is possible that the newly described *Bufo blombergi* is the largest toad in the Western Hemisphere, or even in the world.

Country and City
Have Different Interests

Your Questions Give You Away

By JOHN V. QUARANTA

Department of Philosophy and Psychology, Manhattan College

It is a commonplace observation that visitors to the Zoological Park are from many different regions. Indeed, they come from all parts of the world, from all quarters of the nation, the state, the city. The many varieties in dress, speech, gesture and gait which one encounters in a cursory tour of the Zoo over a summer week-end only serve to enhance the impression of universality. Obviously the appeal of a zoological garden is extra-cultural, "beyond culture," in the sense that animals and plants appropriately displayed have an intrinsic fascination for almost everyone without regard to the special circumstances of his early childhood training and experiences.

It would be contrary to expectation, however, to affirm that the subjective reactions of all visitors to the Zoo are identical. Undoubtedly, Zoo interests are organized and formed much in the same way as sports interests, or vocational interests, or political interests. Both interests and attitudes are culturally determined and conditioned. There is no evidence to support the belief that they are genetically determined. Now, it was precisely this kind of thinking which led me to undertake a short-term experimental study designed to determine whether Zoo interests are really related to a particular regional-cultural milieu. The suspicion that some such relationship might actually be operative among the visitors to the New York Zoological Park developed force after several visits to the Question House, where attendants attempt to answer all reasonable questions pertaining to the Zoological Park and its animal inhabitants. An informal analysis of the questions showed very clearly, from the very beginning, that the inquries of children were more suggestive of a relationship between interest and regional-cultural milieu than those of adults. As one might expect, children are closer to their provincial, cultural molds than their parents. The standardizing influence of common educational and vocational experiences tends to mask regional differences. The masking effect is certainly more pronounced in the cases of those who have gone on to higher academic degrees, or who in one capacity or another have had occasion to represent the larger business organizations. Frequently such responsibility implies tremendous social mobility: traveling and living in many different areas, making a wide variety and number of social contacts, witnessing all kinds of group affiliations. Provincial interests and attitudes can hardly persist under these circumstances.

In order to test my observations in an experimental way, I undertook to design a simple questionnaire to be submitted to all children asking questions at Question House. The child was asked to write out his own question about the Zoo, in his own words. If this was not possible, the attendant was instructed to write it out in the child's original idiom. Paraphrasing and restatement were to be avoided at all costs since all such reconstructions might well prevent the experimenter from capturing the mind of the child.

A sample questionnaire is given below.

1. What is your question? (Original wording)
2. What made you ask the question? Was it anything you saw in the Zoo?
3. Do you have any pets of your own?
4. Age:
5. School Grade:
6. Address:

(Boro, County); (City); (State)

During the course of a six-weeks period, three

hundred such questions were gathered. Of this number, 126 had to be discarded for reasons of incompleteness, irrelevance, adult rephrasing despite the admonition of the attendant or questions asked by adults on behalf of their children. The age range for the remaining 174 questionnaires is from six to fourteen years. The corresponding school-grade range is from first grade to second year High School. Preliminary examination of the questions suggested the possibility of a two-fold division for purposes of statistical analysis. First, the questions were separated on a regional basis: city versus country. This first division yielded 157 questions from city children and 17 questions from country children. The city children were mainly from the New York area. Country children were mainly from outlying suburban areas in New York State. A few questions were from rural areas in the mid-west. The second division was in terms of Quantity versus Activity. The preliminary data provided presumptive evidence for the belief that city children tended to ask *quantitative* questions about animals. How much does it cost? How big is it? How much does it weigh? How long is its tail? How long does it live? Children from suburban areas, on the other hand, seemingly were more interested in the *activities* of animals. Could a bird live without its mate? Can a horned toad really shoot blood from its eyes? Do snakes swallow their young for protection?

The two-fold classification of the obtained data may be conveniently summarized in the following table.

	Quantity	*Activity*	*Totals*
City	107	50	157
Suburban . . . (Country)	4	13	17
			174

Even without benefit of statistical test, it is apparent that a clear-cut trend in favor of quantity exists for the city children and a mild trend in favor of activity exists for the suburban (country) children. The English statistician, Karl Pearson, has provided us with a most sensitive test for evaluating the obtained results. It is known as the Chi-Square test of significance. Application of the Chi-Square test for significance establishes clearly the trend of quantity questions in favor of city children. The probability that such a trend could have occurred purely by chance is approximately 1 out of 100. In other terms, it is extremely improbable that this result occurred by chance. The trend of activity questions in favor of suburban (country) children is established but not definitively as in the former case. The probability that the activity trend could have occurred purely by chance is approximately 11 out of 100. Although it is improbable that this result did occur by chance, it must be conceded that the improbability level is not as high as in the former instance.

The lack of definitiveness in the activity results might very well be due to the paucity of questions in this area. It might also be noted that children in the suburban areas sampled have frequent city affiliations.

A conceptual interpretation of the results is in order at this juncture. It is believed that the relationship between the Zoo interests of children and their respective regional-cultural milieu can best be understood in terms of social conditioning. This is to say that the patterns and directions of a child's attitudes and interests are largely formed by such extrinsic determinants as sex, age, nationality, cultural milieu, home environment (including father's occupation) and locality. As A. A. Schneiders has observed:

"The interest of the typical American boy in playing cowboy is not likely to be found in areas where this tradition is unknown; nor is the avocation of building model airplanes likely to attract the interest of the islanders of the South Pacific. Even such a circumscribed factor as locality will play a definite part in determining interest, as revealed by Jones and Conrad in their study of rural preferences in motion pictures (1930)."

The value of short-term studies as outlined in the above ought not to be underestimated by writers of children's nature books and by teachers and parents alike. It is believed that extension of the survey described here to other zoological gardens will only serve to corroborate the results obtained.

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News from the Conservation Foundation

"Saturday Evening Post" Carries Ordway Editorial

"Alaska Now" has been the slogan of the Conservation Foundation staff for the past six months and significantly, the January 12 issue of the *Saturday Evening Post* ran a signed editorial by Samuel H. Ordway, Jr., a Foundation vice-president, entitled "We Mustn't Let Alaska's Assets Be Lost Through Indifference."

Pointing out the importance of Alaska to our national defense and emphasizing the fact that 99 per cent. of Alaska still belongs "to you and me," the editorial goes on to assert that since the military has been given the green light to develop Alaska in the name of defense, it is vitally necessary that some controls on growth be set up. Otherwise, "As that development proceeds, it may attract an influx of speculators and money borrowers taking advantage of present public-land laws and Federal assistance, producing a stampede wilder than in the wildest days of misuse of the West."

The editorial continued: "A rapid increase in population and use of available resources could, if wisely planned, be beneficial to Alaska's growing economy and to the dynamic development there of American enterprise. Or they could, as too often in the past, become destructive of the resources upon which future prosperity as well as defense depends.

"Congress should speed up fact-finding, and carry out programs for land and resource classification, and make plans for land disposal, which will deter the entry of those whose only desire is to 'cut, burn, take and move on' and encourage instead the entry of responsible capital interested in sustained production.

"The way to discourage speculative exploitation and encourage responsible enterprise is to place limitations upon the use of land before its disposal, limiting each homesteader, licensee or purchaser to land uses appropriate to the tract occupied and to the kind of practices permitted in states which now have modern forest-practice acts, soil-conservation-district laws, commercial fish-and-game controls, recreational reserves and similar conservation policies. These policies have proved themselves economic stabilizers and assets.

"It is up to all owners of Alaska to see that Congress, providing billions for military needs, also provides the means required now to bring prosperity to this land and its people."

In the course of his editorial, Mr. Ordway remarked that although we set aside locations for naval and military bases as early as 1906, we did little to man or defend them, and commented that "We have been equally neglectful of Alaska's wealth in natural resources." As one example, he pointed out that eighty per cent. of the virgin forest has been burned over since the white man came to Alaska.

Alaskan Study Concluded February 1

The 90-day period set for completion of the Foundation's critique of the Department of the Interior's six-year plan for Alaska rather stretched the man-power of the staff, and nearly all hands had to turn to in order to finish the job on time. This six-year program represents the composite proposals for Alaskan development in the immediate future as they are projected by the several government agencies involved under the Department of the Interior leadership.

On January 7, Robert G. Snider flew to Juneau to attend the Alaska Field Committee meeting, January 8 to 10. Interviews with many persons familiar with the Alaskan situation held by him in California, Washington and Alaska, have been most helpful in checking the opinions developed "Stateside" by the staff.

BEHIND THE SCENES

NEWS AND NOTES OF THE ZOOLOGICAL PARK, THE AQUARIUM AND THE DEPARTMENT OF TROPICAL RESEARCH

Zoological Park Records Fell in 1951

There is a direct relationship between the weather and attendance at the Zoological Park — in bad weather New Yorkers notoriously stay at home or venture minimum distances from the subway. The weather happened to be favorable for out-of-doors expeditions in 1951, with few rainy week-ends, and 2,583,471 persons came to the Zoo — an increase of 105,532 over 1950.

Both the Children's Zoo and the riding tracks continued their trend of the past few years toward ever-higher patronage. The Children's Zoo had 384,123 visitors, an increase of 26,822. The animal riding track was up 29,002 rides to a total of 127,305, and the pony track gave 216,038 rides, an increase of 1,673.

"Research" by Mail

The General Curator's office is accustomed to requests for animal information that would take days if not weeks to compile, so it was not surprised recently to receive a request from a college student for "enough information about seven animals to fill fifteen typewritten pages." He did take the trouble to list seven animals.

Since the student was in a large city with ample library facilities, the General Curator's office sent him a bibliography through which he might do his own "research" on the seven animals.

Herbert Breaks the Ice

Last winter misguided visitors to the Zoological Park several times attempted to break the ice on the Harbor Seal pool, thinking that the animals would suffocate under the ice — not knowing that they were keeping a blow-hole open.

This winter "Herbert," our new Walrus, shares the pool with the Seals and is so active that the surface has not yet frozen completely over. The Walrus sleeps among the ice cakes, most of his body in the water and his head lying on a rock on the shoreline. It would seem to be a chilly bed, but the water is, of course, warmer than the air on the occasions when the temperature has dropped far below the freezing point.

"Red Tide" Sample from Florida Was a False Alarm

The so-called "Red Tide" that caused an estimated damage of millions of dollars to resort and sport and commercial fishing on the Gulf coast of Florida four years ago has had minor and sporadic recurrences this winter, and Dr. Ross F. Nigrelli, the Aquarium's pathologist, has again been asked to make examinations of water from a suspected area.

Four years ago his determination — concurred in by government and university investigators — was that the "Red Tide" was a sudden "blooming" of dinoflagellates, a plankton organism. The dinoflagellates are toxic to fishes and enormous quantities were poisoned, so that long coastal areas were polluted by the decaying marine life.

The Islamorada Yacht and Fishing Club, suspecting the "Red Tide" in its area, sent Dr. Nigrelli a sample of the water. He found no dinoflagellates in the sample, however, and later learned that the discoloration that caused alarm of club officials was caused by stained water flowing from the Everglades.

Aquarium Men at AAAS Meeting

The annual meeting of the American Association for the Advancement of Science, held in Philadelphia in December, was attended by Drs. Nigrelli and Gordon of the Aquarium staff, who presented papers before the Society of Protozoologists and the American Society of Zoologists, respectively.

Dr. Nigrelli was elected to the Council of the AAAS as the representative of the Society of Protozoologists, an organization which he helped to found a few years ago.

It was with great difficulty that Staff Photographer Dunton managed to get this picture of our new albino White-tailed Deer. The animal is still extremely shy of its keeper and visitors.

An Interesting Albino — But It Is Not on Exhibition

Albinism is so common in the animal kingdom — it occurs in mammals, birds, reptiles, amphibians, fish and insects — that it is not always easy to understand the interest aroused by any particular example. Nevertheless we now have in our collection an albino whose beauty alone is an excuse for unusual attention. Unfortunately its very albinism is such a handicap that we have not been able to put it on exhibition.

The specimen is a snow-white White-tail Deer buck, born in the spring of 1951. As in so many albinos, its unpigmented eyes are strongly affected by daylight and its vision is so imperfect that it takes alarm at the slightest unfamiliar sound or situation and — not seeing clearly where it is going — dashes headlong into fences.

The animal was picked up on November 30 by oyster wardens patrolling in the Great Peconic Bay at the eastern end of Long Island. Earlier in the year a white fawn had been reported on Robins Island in the bay, but whether it was born there or on Long Island was unknown, as deer frequently swim across the bay.

When the oyster wardens found it, it was swimming in circles off the south shore of Robins Island and was almost exhausted. They hauled it aboard their boat and bedded it down for the

night in a box stall on Robins Island. The following day Mr. Samuel Webb reported the animal to General Curator Crandall and, with the permission of the State Conservation Department, we brought it to the Zoological Park.

It had made an excellent recovery from its exhaustion and fed and drank well during the few days it was under observation in the Animal Hospital. The first attempt to liberate it in a large corral on the west side of the Zoological Park nearly ended in tragedy, however, for the deer dashed repeatedly into the fence and was only quieted when it was driven inside a shelter hut. It is still feeding well, but the necessary visits of the keeper alarm it to such an extent that they are kept to a minimum.

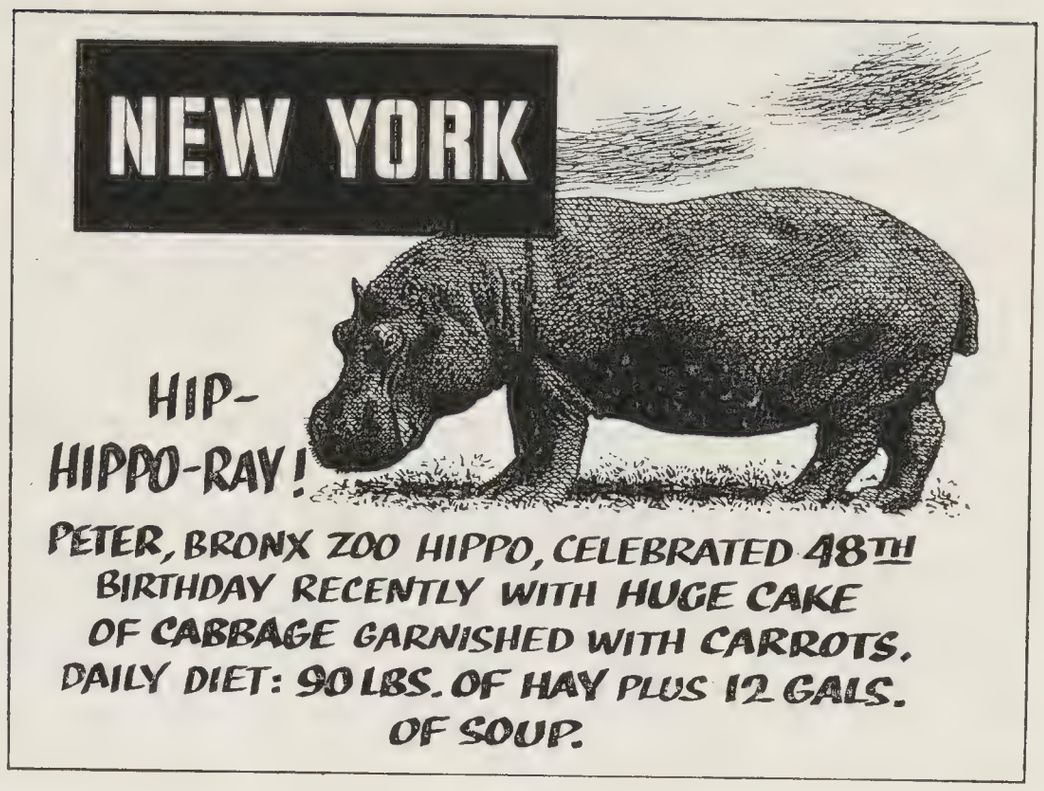
In the belief that the animal would not run into the fence if it could see the barrier, the General Curator is preparing to "wall in" the corral by applying waterproof paper to the wire fence. If that does not work, the albino will have to be kept indoors until spring when our adult White-tail bucks have dropped their antlers. Then the newcomer can safely be introduced in the large White-tail enclosure. The presence of other deer and the remoteness of the fences make it likely that the animal will settle down.

Tropical Research Department On Fiftieth Expedition

The Fiftieth expedition of the Department of Tropical Research began on January 14 when Dr. William Beebe, Miss Jocelyn Crane and Miss Ellen Ordway left New York for the Society's permanent field station at Simla, in Trinidad.

The party, with the bulk of its equipment, travelled on the *Alcoa Pilgrim,* stopping en route at Bermuda, various islands in the West Indies and at Venezuela before reaching Port of Spain. Henry Fleming, the department's entomologist, followed by plane.

The expedition will be at the research station for about five months. Its main objectives will be completion of a preliminary report on Arima Valley ecology and comparative studies of social behavior in butterflies and defensive behavior in mantids. Work on the analysis of insect color patterns and of the ecology of caves will be continued.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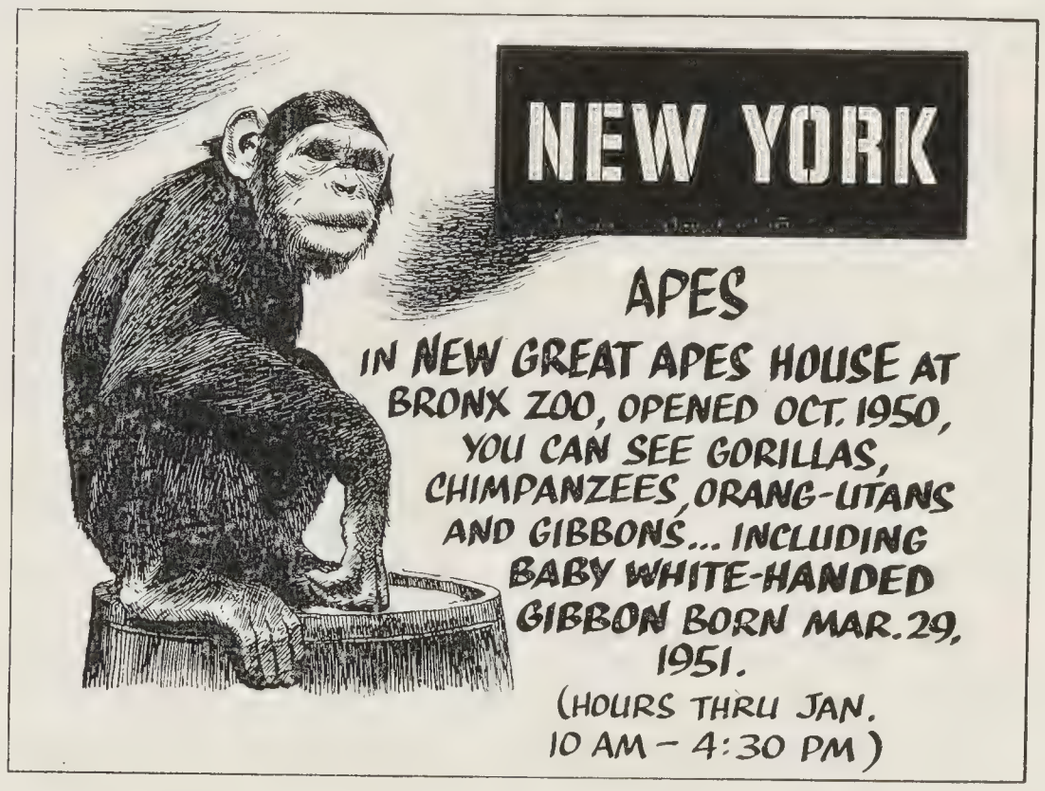
HIP-HIPPO-RAY!
PETER, BRONX ZOO HIPPO, CELEBRATED 48TH BIRTHDAY RECENTLY WITH HUGE CAKE OF CABBAGE GARNISHED WITH CARROTS. DAILY DIET: 90 LBS. OF HAY PLUS 12 GALS. OF SOUP.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IN NEW GREAT APES HOUSE AT BRONX ZOO, OPENED OCT. 1950, YOU CAN SEE GORILLAS, CHIMPANZEES, ORANG-UTANS AND GIBBONS... INCLUDING BABY WHITE-HANDED GIBBON BORN MAR. 29, 1951.
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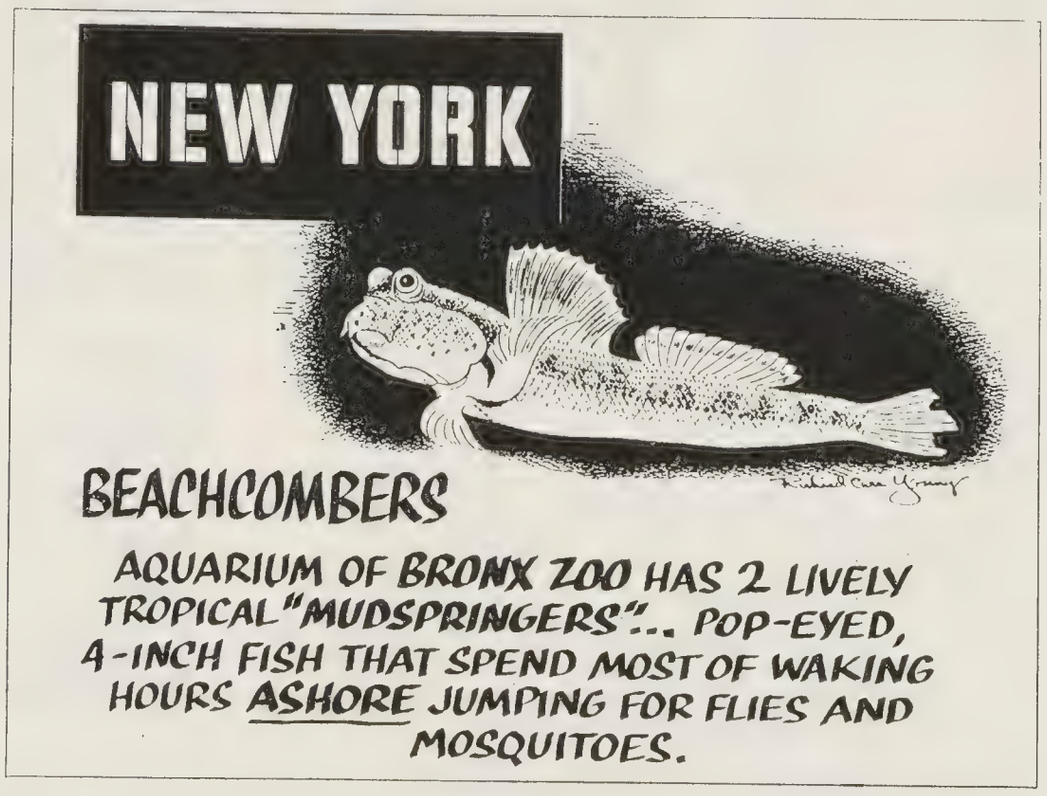
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BEACHCOMBERS
AQUARIUM OF BRONX ZOO HAS 2 LIVELY TROPICAL "MUDSPRINGERS"... POP-EYED, 4-INCH FISH THAT SPEND MOST OF WAKING HOURS ASHORE JUMPING FOR FLIES AND MOSQUITOES.

The Zoo's Attractions on Subway Cards

Recognizing the fact that a very large proportion of the Zoological Park's two and a half million visitors each year come by subway, the New York Subways Advertising Company is displaying a series of car cards in the subways calling attention to various exhibits in the Zoo. Some of the most recent are pictured above.

PUBLICATIONS OF INTEREST

WILDLIFE IN COLOR. By Roger Tory Peterson. 191 + vi pp., 453 illustrations in color. Sponsored by the National Wildlife Federation. Houghton Mifflin Company, Boston, 1951. $3.

Since 1939, the National Wildlife Federation has been publishing its well-known poster stamps in color, at the rate of 36 each year. Well drawn by eighteen of the country's leading delineators of nature and beautifully reproduced, these posters are now gathered in a single volume, admirably held together by a text written by Roger Tory Peterson. The result is a handsome little book, which will carry the message of conservation to many. — L. S. C.

MONKEYS AS PETS. By Leonore Brandt. 96 pp., 27 illustrations from photographs. Published by All-Pets Magazine, Fond du Lac, Wisconsin, 1951. $2.

Mrs. Brandt, who is Curator of the Children's Zoo in the Cincinnati Zoological Garden, is obviously very fond of monkeys and her little book is a frank exposition of this feeling. The material is largely anecdotal but scattered throughout and concentrated in a final chapter, there is much useful and practical information. Mrs. Brandt's enthusiasm leads her to give the general impression that she considers all Primates, of whatever age or sex, to be sweet and gentle creatures. However, closer reading reveals many qualifications, which help attain a realistic evaluation. — L. S. C.

THE SEARCH FOR THE SPINY BABBLER. By Dillon Ripley. 301 pp., 18 illustrations from photographs. Houghton Mifflin Company, Boston, 1951. $4.

While this book undoubtedly falls in the category usually designated as "travel-adventure," it should certainly be assigned to a special niche reserved for those of unusual interest. It is an account of a bird collecting expedition, carried out during the winter of 1948-9, in forbidden Nepal, home of the warlike Ghurkas. In light and humorous style, Dr. Ripley presents a fascinating picture of that little-known land of mountains, where continuous felling of the great forests is bringing rapid and drastic faunal changes. Rediscovery of the Spiny Babbler, unrecorded for more than 100 years, was only one of the important achievements of the expedition.
— L. S. C.

THE BIRDS ARE YOURS. By Robert S. Lemmon. 121 pp., 44 drawings in black and white by Don Eckelberry. The Macmillan Company, New York, 1951. $2.25.

In a series of 44 short essays, Mr. Lemmon covers briefly as many phases of the life activities of birds native to the United States. Written in non-technical style, primarily for younger readers, the points are so clearly made that they will have general appeal. Mr. Eckelberry's black-and-whites are extremely well done.
— L. S. C.

THE APE IN OUR HOUSE. By Cathy Hayes. 247 pp., Illus., Harper & Brothers, New York, 1951. $3.50.

Scientifically intrigued by the question of just how intelligent apes are in comparison with man, Cathy Hayes and her scientist husband adopted a three-day-old chimpanzee in 1947. With infinite care, patience and love they brought up "Viki" and introduced her to the strange civilization of human beings in their home in Orange Park, Florida. "Viki" was amenable and learned an astounding amount in her three years with the family. She never learned, of course, to talk, and Cathy Hayes' conclusion is that it is the language barrier more than any other that differentiates apes from humans. Always interesting, Mrs. Hayes' conclusion is reminiscent of the old saying in which the French express their intelligent sentimentality towards a favorite animal: "Il ne lui manque que la parole."

New Members of the New York Zoological Society

(Between November 1 and December 31)

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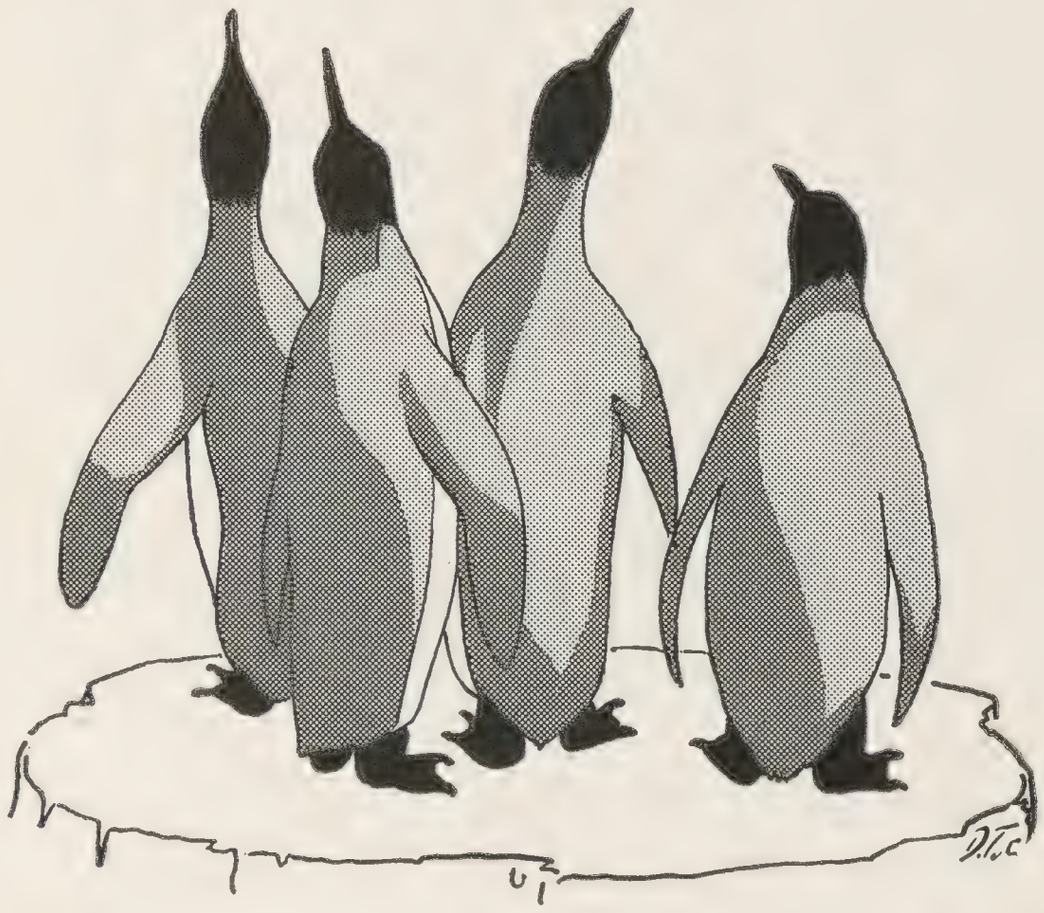
An Expedition you will wish to join



HERE IS A BRAND NEW BOOKLET that should be in the hands of everyone who has an interest in any phase of the work of the New York Zoological Society.

In it we outline the Society's past, tell of our interesting progress since the war, and foretell the future of this unique organization — and there are pictures of practically everything and everybody.

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ANIMAL KINGDOM

Bulletin of the New York Zoological Society

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Issued bi-monthly at the Offices of the New York Zoological Society, 30 East Fortieth Street, New York 16, N. Y. Editorial and Subscription Offices, Zoological Park, Bronx Park, New York 60, N. Y. Title registered with United States Patent Office • Subscription, $3.50 a year; single copy, 60 cents. Same rates for all foreign countries and Canada. All pictures not otherwise credited are from the photographic collection of the New York Zoological Society.

The Society and Alaska

THESE BRIEF THOUGHTS are half-soliloquy and half-news item. They concern Alaska — a vast region, as we all know; the last frontier this country possesses. One wonders what it will be like, say fifty years from now — this region that is one-fifth as large as the combined area of all of our States. Relatively few people live there now. It has a resident population of about 128,000, of which 35,000 are so-called "natives" — Eskimos, Aleuts and Indians. Unquestionably its population will increase substantially. Among other questions, will we make fair and just plans for the future well-being of the natives, and do a far better job, it can be hoped, than we have done for the Indians in the States? Also, how effective and far-sighted will our plans be for the long-term protection of the superb forms of wildlife, several already seriously threatened?

Quite aside from the importance of this great northern region as a strategic center, whether for air transportation or military defense, its values in natural resources are still only partially determined. Alaska holds the possibility of becoming one of our nation's most desirable possessions, a grand and beautiful region lying within virtually the same latitudes as Sweden, though not quite so favored climatically.

What we do with Alaska lies within the choice of our people now. It can be thoughtlessly or unwisely managed, exploited and irremediably damaged, or contrariwise, developed under a well-considered program that will make the most of its natural assets for the long future.

For several years our Society has been trying to determine what contribution it might make to the future of wildlife conservation in Alaska. Apart from, yet supplementing, the work done by The Conservation Foundation that culminated in a lengthy report with recommendations to the Secretary of the Interior, our Society will this year undertake an intensive study regarding the present status of the caribou and the relationship of herds of these animals, as well as reindeer, to the native populations. At the same time observations will be made on the status of other forms of wildlife. This project will be carried out by Dr. A. Starker Leopold of the University of California and Dr. Frank Fraser Darling, eminent Scottish ecologist, who will leave for Alaska in early June and remain there until mid-September. It is hoped that their report will be ready for publication by the year's end.

Fairfield Osborn

APR 10 1952

Individuals All: A First Repo

THE FIFTIETH EXPEDITION of the Zoological Society's Department of Tropical Research began at nine o'clock in the evening of the fourteenth of January, when the *Alcoa Pilgrim* drew away from Pier One in Brooklyn. The only point of focus in this utterly uninspiring statement lies in the word "Fiftieth," and the only excuse for special emphasis is the human weakness for a decimal mathematical mile-post. This persists in spite of the fact that most important historical events have occurred on non-decimal dates – viz., A.D. 1, 32, 1066, 1215, 1492, 1776, etc. So "Fiftieth" implies nothing more than a link between the 49th and a possible 51st. Whether the Fiftieth Expedition will produce anything memorable, depends considerably less upon Numerology than on intelligently applied activities of the various staff members.

In the course of seventeen enjoyable days the *Alcoa Pilgrim* made stops at Bermuda, the Virgin Islands, and on to Venezuela—La Guaira, Guanta, Puerto la Cruz and Caripito.

On the very first day of the trip something occurred that influenced my focus of awareness for the ensuing two weeks. This was the quality of INDIVIDUALITY or of CONTRAST. The advantage and the disadvantage of such definiteness is that its application spreads in all directions with resultant embarrassing absorption.

For example, by the first morning at sea we had picked up fifteen followers – Herring Gulls who had left their scavenging in New York waters for the opportunity of joining the "Fiftieth Expedition of the D. T. R.!" Eleven of these silvery gulls – *Larus argentatus* – were in fully adult plumage, three showed signs of immaturity, while the brown feathering of the fifteenth identified it as a young bird of the year.

As I watched the gulls from the bridge, a bit of paper was put into my hand. All unnoticed there had come through the flock of birds a series of waves in the ether, unaffected by earth curvature, sunshine, warmth, wind or sea, straight to the radio antenna at our masthead. There they delivered a message of friendly cheer. I rejoiced at the unexpected greeting, the gulls cackled with excitement over a floating slice of bread, and we were all happy.

The INDIVIDUAL gull of the year was distinguished by the loss of two larger wing feathers. Its swiftness and maneuverability soon became noticeable, or perhaps it was some slight advantage of eye-sight which enabled it so often to be the first to reach food from the galley. Long before we docked at Bermuda it was evident that the young gull had learned a valuable fact – the port location of the chute down which the cook dumped his garbage. Of the fifteen gulls it was the brown one which spent much of his time to port and close behind the stern, a position which, again and again, enabled him to get the jump on his fellows. Six times a day – before and after meals – the galley largesse was due, and it was seldom that the young bird was not waiting at scratch, ready for the dive to the water-strewn feast. On the last day his fellow gulls began to close the psychological gap, perhaps, vulture-like, by watching and benefiting from his prompt reactions.

We lost eight gulls to ships passing us en

route to New York, but the youthful bird remained. In fact, he and a juvenile companion accompanied us for a full day of our southern reach, and then, indisputedly identified by his missing primaries, deserted us for a return to the colder, temperate zone of his winter haunts. He was the first INDIVIDUALIST of the trip.

Next year he will molt into a lighter color, and in several more seasons will be indistinguishable from the eleven adults. I wonder if there is any chance of his slight sensory precocity being preserved and perhaps handed on to his grandgulls?

On the dock at Hamilton, Bermuda, there was a compact flock of about eighty English Sparrows, gleaning from spilled grain and cereals. They alighted, they fed, they took wing as one bird, now and then rising in a flurry and forming a dense, feathery mat on the warehouse roof. Three

From Expedition No. 50

By WILLIAM BEEBE

females stood out from the rest as being always the last to leave any scattering of seed. One of these became the center of attraction of a trio of persistent suitors. They followed her every movement, they interfered with her meals, and they never ceased hopping about her in their comic pouter pigeon pose, like poorly made mechanical toys, with dragging wings and upraised tails.

We left the dock early on a Sunday and carried two extra passengers on the lower deck – the female sparrow and one of the three males. She had found a drifted pile of seeds and was feasting alone. Until we cleared the inner harbor the male remained, unceasing in his futile importunities. He then flew to the rail, took to wing and fled back in our wake to his flock. The female fed and fed and not before we were off the tip of the Navy Yard did she too fly to the rail. Like any migratory bird she circled once, but then, very like an English Sparrow she took off in the wrong direction, heading straight for the giant navy crane. Here were two INDIVIDUALS out of eighty-odd, set apart from their fellows by unusual urge of hunger and of sex.

Our ports of call themselves loom as additional beads upon our INDIVIDUALISTIC string: Bermuda, our memorable oceanic home for a decade, is intensely British Colonial with an American veneer; St. Thomas, pure or impure American with a forefront of tourist bait; La Guaira a super-commercial jumping-off place for the lofty splendors of Caracas; Guanta, an isolated native fringe along the Spanish Main, overhung by coconut palms, and flecked with the shadows of soaring vultures, existing only as a terminus for astronomical quantities of oil. Finally, Caripito, another oil outlet but reached through miles of sheer jungle in which, from the deck, we may see much of the wild life of northern South America. There is no better or more comfortable introduction to tropical fauna.

Our ample Alcoa cargoes presented characteristic cross patterns of tropical wants. To the American island of St. Thomas we brought, not "ivory, apes and peacocks," but pails, folding doors, lamps, infants' bathtubs, cemetery materials, coin operating machines, pickles, cigarettes, vinegar, dog food, whiskey, rubber cement, pork snouts and tails, woven fence, mattresses, Coca Cola, toilet paper, ice cream, carpets, perfumery, airplane supplies, and, in the words of the King of Siam, et cetera, et cetera, et cetera.

The wants of Venezuelans differ somewhat from the desires of colonial Americans. Among many other things, we delivered at La Guaira enormous quantities of empty bottles and tin cans, barbed wire, fertilizer, sinks, marbles, venetian blinds, tractors, shoe dressing, cheap perfumery, tooth brushes, pickles, baking pans, books, beer, tobacco, auto parts and postcards.

To recount our activities in the various ports would be partly to repeat last year's reports. The tragedy of the Bermuda cedars is at its climax. A scattering of trees is still alive and flourishing, again emphasizing the importance of the INDIVIDUAL. These are probably tolerant rather than immune to the ravages of the two species of lethal scale insects, or it may be that the introduced parasitic lady-beetles have belatedly begun their counter attack.

Guanta, in Venezuela, has the beginning of similar trouble, for the existence of its only grove of coconut palms is now threatened by a boring beetle. I located the nest of small parrakeets in a rotten stub on the edge of a dry stream bed, and had almost reached the squawling nestlings when a branch broke and I dropped about seven feet into the arroyo, just missing a dead dog lying on the waterworn pebbles below. As I picked myself up, a trio of ragged urchins armed with sling shots offered to rob the nest and to slay both parents. Boy Scouts are sadly needed in Guanta!

A more pleasant experience ensued when we anchored in an island-bounded bay off the great Venezuelan mountains of the Spanish Main. The water was so calm that I unlimbered my giant binoculars on deck and watched all the water birds in sight, at their various methods of fishing. We recorded nine different ways in which harassed fish were captured.

Among the mangroves a half mile off were Egrets and Herons slowly stalking and, with open mandibles, striking at the small shore fish. A snakebird swam slowly along, submerged, sprung its neck trigger and speared its prey. Farther offshore occasional Cormorants perched on channel buoys and, now and then, slipped into the water to pursue and seize unfortunate fish in their own element. One method which we did not actually observe but knew from past observation was that of Scarlet Ibises, a dozen of which flew over the steamer. These beautiful birds walk slowly through the shallows and poke and probe under roots and stones in search of worms and small fish.

The Terns and Boobies had similar ways of getting their food, although they differed strongly as to delicacy and force. The Terns dived with a gentle splash and emerged at once, usually with a wriggling anchovy or silversides. The Boobies, on the other hand, hurtled out of the sky with an arrow-headed plunge, sending the spray high and wholly disappearing from sight. Bobbing up again they labored into the air with a good-sized fish. The creatures of the sea seem to have no defense against this aerial bombing.

Pelicans were equally successful in their dive, but utilized not their beak tip but their pouch, the force of the water distending it into a great bag of skin which usually engulfed a whole school of small fry. A gull occasionally perched on the Pelican's head and seized the overflow of fishlets as they wriggled free of the dripping pouch.

The flock of Laughing Gulls about our vessel had a terrible time with the remains of two large fish which had been thrown overboard. These were too heavy for the delicate birds to lift clear of the water but each bird in turn hoped for super-gull strength. In the midst of the squabbling the shadow passed of the master flier, and a Frigatebird glided effortlessly down, and with an infinitely graceful and efficient twist of neck and beak scooped up the fish. If he had been more hungry and less lazy he would have pursued a Booby and forced it to disgorge a still wriggling fish, then dived with unbelievable swiftness to seize the falling fish before it reached the water.

In this warfare, considered from any angle, the fish have a thin time of it. Even when they strive to emulate the birds, and to become so-called flying fish, it is only to escape the attacks of their voracious fellows.

This interrelation has been going on for milleniums with successful survival on both sides. The apparent numerical unfairness is resolved when we realize that the average number of eggs deposited by the nine piscivorous birds is two to three, whereas the roe of fish may contain tens of thousands or even millions of potential fish. In this case the INDIVIDUAL is submerged in the MULTITUDE. The balance of Nature is a very wonderful thing.

La Guaira shows the profound effects of three conflicting physical forces, human devastation, natural erosion on a gigantic scale, and human construction. Much of the barrenness of the mountains is due to past wilful destruction. After the Spanish conquest all the forests were cut, the

The tiny harbor of Guanta on the coast of Venezuela is a good place to study the behavior of Pelicans.

Alcoa Steamship Co. Photo

consequent erosion not being sufficient to stop the growth of grass. Then thousands of goats were turned loose; the herbage went, the rains came and the soil went. Relative stability ensued, with the present adventitious, dusty, desert growths of cactus and acacias.

Now and then Nature takes a tragic hand and last year, after unprecedented rains, she pulled down the mountains upon the narrow coastal strip of La Guaira, filling the streets with debris of houses, people and boulders. Little by little the mess was cleared up and today new houses are perched upon newly exposed precipices, in readiness for new landslides. As an indirect result of the catastrophe there is no more anchorage for small boats. All along the shore where were rocky promontories and water-worn ledges are now beaches of sand – the finer siftings of erosion. The tiny shelter where yachts and dinghies were once safely moored is choked up and the boats themselves are land-locked and useless.

The third phase of geographical disturbance is now in progress. A new highway to Caracas is almost finished, mountains have been levelled and new mountains piled up; naked cuts are connected by tunnels and trestles. Time itself will be altered by man's efforts – the visitor will be able to reach Caracas in one-half instead of two hours. The question remains, what use will be made of this hardly won hour and a half?

We travelled up by the wonderful old road with breath-taking vistas at every turn, and which always, for us, ends under the hospitable roof of William Phelps. There we experienced the special pleasure that bird men feel at hearing of a new discovery: a Cedar Waxwing and an Indigo Bunting had just been found in Venezuela. These were old friends of ours in the north, but these two individuals were very special – migrants, the first to be recorded from the South American continent itself: INDIVIDUALITY cropping up again!

Our most dramatic memory of the *Alcoa Pilgrim* was the very last, the trip up the Rio San Juan from the Gulf of Paria to Caripito. At five o'clock in the morning we entered the mouth and at once became shut in by mangroves, the vanguard of that immense forest of a single tree. At five-thirty a flock of three hundred Scarlet Ibises flew over, a brave remnant of the thousands which we saw on our first trip forty-five years ago. Later, thirty more birds came into view, like a treeful of brilliant blossoms. As the day broke we saw green Amazon Parrots and a flock of screeching Parrakeets, then five kinds of Herons and Egrets, Blue, Gray and White, Hawks in pairs watching us pass, while logs turned into Crocodiles. Higher up, with palms appearing, pairs of Macaws vibrated overhead, White Flycatchers, River Swallows and an Anaconda coiled on a lighted beacon. Finally there rose the roar of a band of Howling Monkeys.

At midnight, conscious only of bats and the voices of night birds, we left Caripito and headed for Port-of-Spain, and Simla.

For three INDIVIDUALS of the Zoological Society's staff the trip of seventeen days was too short. In the leisurely tempo, the unexepected stopping at interesting ports, the kindness and informality of the captain and officers, the freedom of the ship from bow to stern, in the comforts of the living quarters: altogether the *Alcoa Pilgrim* might have been our own private yacht. We were happy pilgrims.

Frogs as Friends of Man

By JAMES A. OLIVER

"The Toad, ugly and venomous,
Wears yet a precious jewel in his head."
As You Like It

IN THE DAYS of Shakespeare, and even long before, the toad was valued as the supposed source of a precious stone variously called *crapo, crapaudina, crapaudine* and *Toad-stone*. To it was attributed marvelous healing powers, particularly against the bites and stings of venomous animals. Many of the old books contain detailed instructions for the removal of the stone – a process requiring great skill and agility, lest the toad snatch it back.

The source of the Toad-stone myth is lost in the vague origins of nature folklore. Perhaps this belief stemmed from the fact that when the toad's eyes are shined at night with a light, they do sparkle with a gleam that would do credit to many a gem. Today we know that toads do not possess any "precious jewel," yet we continue to value frogs and toads – for many and more substantial reasons. We know that frogs (toads are merely one of the different kinds of frogs) contribute a great deal to man's welfare and happiness.

Perhaps the earliest use that man made of frogs, other than in folk rituals, was to eat them. He is still eating them – and in large quantities. Frog legs are highly esteemed as a table delicacy and bring a good price in the markets of the world. For the purpose of supplying part of the market demand, many attempts have been made to raise frogs in confinement on "frog farms," but none has proved sufficiently successful to support a

commercial enterprise devoted solely to the production of frog legs.

Enticing advertisements can be seen in outdoor magazines from time to time, calling attention to the large sums awaiting industrious individuals who undertake to raise frogs. The advertisements offer instruction in frog-farming, or a limited number of "super-giant, fast-breeding, tasty-thighed breeding stock." As pointed out by the eminent herpetologist, Karl P. Schmidt, the only one who makes any money from such an enterprise is the man selling the lessons or the breeding stock.

These remarks apply to the raising of frogs in confinement as a profitable, self-supporting commercial enterprise. However, the cropping of frogs from small ponds on a controlled basis does afford a regular means of augmenting the food supply. The control of ponds can be carried out simply and yet in a way that materially increases the number of frogs produced. The Japanese have utilized such methods for many years.

Recently a farmer in Alabama reported harvesting 250 frogs per year, over a three-year period, from a farm pond of 1½ acres. At the prevailing price of frog legs the annual yield from this pond would be valued between $100 and $125. In this instance the pond had been stocked several years earlier by a natural movement of frogs into it from a stream an eighth of a mile distant. The only care provided by the farmer was partial control of predators. Usually, where artificial ponds are used, it is advisable to introduce the larger local species of frogs in order to get production started as soon as possible. Active control of predators, abundant food supply and ample shelter are the primary essentials for a good frog yield. These can usually be provided with little trouble or extra work.

The majority of frogs that reach the market have been caught in the wild by professional frog-hunters working at night with a light. The amount of their income varies, of course, with the abundance of frogs and the market demand. In the United States most of the frogs brought to market are collected in the Gulf states, the northern Middle West and the Northeastern states. Formerly the American demand for frogs was filled entirely by domestic sources, but today large numbers of frog legs are imported, principally from Japan and Cuba.

The Cuban exporting trade is a relatively new enterprise. It was started by the introduction of the American Bullfrog (*Rana catesbeiana* Shaw) and has shown remarkable growth. In 1941, we imported 381,457 pounds of frog legs but by 1948 this figure had reached 766,262 pounds.

The Cuban production bears an interesting relation to the local price of tobacco. When tobacco is low, many tobacco workers take up frog hunting to augment their income. When tobacco goes up, these workers are too busy to bother with frogs and the number collected drops perceptibly. Thus, if you're fond of frog legs, don't smoke too many Cuban cigars!

In the United States the Bullfrog (*Rana cates-*

"Shining" a Bullfrog with an acetylene torch or an electric lamp, and simply picking it up while it is dazed by the glare, is good sport but too tedious for big-scale catches.

American Museum of Natural History Photo

beiana Shaw), the Southern Bullfrog (*Rana grylio* Stejneger), the Green Frog (*Rana clamitans* Latreille) and the Leopard Frog (*Rana pipiens* Schreber) are the species that make up the bulk of the commercial frog trade. There is considerable difference in size among these species. Formerly only the larger adults were used, but now virtually all sizes may be sold. The Bullfrog is by far the most famous of the frog leg species and has been introduced beyond its natural range in the United States as well as into many foreign countries. Conversely, with the increased demand for frogs and the development of more efficient collecting methods, populations of the commercially important species have been greatly reduced in some areas. Many states have found it necessary to institute laws regulating the hunting of frogs.

Virtually all species of frogs contribute to man's welfare through their feeding habits, for all are carnivorous, and primarily insectivorous. The kinds of insects eaten vary with the habitat of the frog and also with the season. Frogs are not notable for their dietary fastidiousness but appear to consume the most easily obtainable and palatable food. The quantity consumed depends to a large extent on the frog's size, although it also is influenced somewhat by temperature. Toads raised in captivity from a size of less than one inch to a length of six inches in sixteen and one-half months consumed between 1,500 and 2,000 insects each.

These food habits benefit man chiefly as they involve the consumption of insect pests of cultivated plants. Various attempts have been made to estimate the dollar value of this activity, but they are so inexact as to be meaningless. Nevertheless, a real value is recognized. Occidental agriculture largely involves plants grown on dry land. The frogs that are most abundant and active on dry land at some distance from the water are those species called toads. Hence it is not surprising to find that the toad has established something of a reputation among occidentals as a desirable pest-controller. On the other hand, among orientals where agriculture includes important plants grown in water as well as those grown on land, both the toads and the more aquatic frog species are valued.

In the United States, numerous books and articles, including government pamphlets, have recounted the benefit that man derives from the toad's insect diet. In most communities the local species of toad is welcomed in the garden and field, despite survival of the myths that toads cause warts.

Probably the most interesting story relating to man's use of his amphibian allies in combating insect pests has to do with the Giant Neotropical or Marine Toad (*Bufo marinus* Linnaeus). This is one of the largest toads in the world, attaining a head and body length of 9 inches. A native of Central and South America, it has been distributed by man over a greater geographical area than any other amphibian, with the possible exception of the American Bullfrog.

Some time prior to 1844 the planters of the West Indian island of Martinique became aware of this giant toad and imported it from French

Guiana. From this first successful introduction it was later carried throughout the islands wherever agriculture was important. In 1932 the Hawaiian Sugar Planters' Association transported 148 adult toads by airplane from Puerto Rico to the Hawaiian Islands. They were a useful ally in the battle against pests of sugar cane and for a time numerous hatcheries were established. The Hawaiian stock has provided toads for the introduction of the species throughout the Pacific area as far west as New Guinea and Australia.

These toads have proved effective in the control of many different insect pests on several agriculturally important plants. One specific example will serve to illustrate this point. Because of the activities of cutworms (insect larvae) in some parts of New Guinea, it had been impossible for several years to raise a crop of sweet potatoes. Small areas could be cultivated only with intensive dusting and handpicking of the insect larvae. The toad was introduced into New Guinea in February of 1937. By the end of that year the depredations of the cutworms had noticeably decreased. The following year an excellent crop of sweet potatoes was produced. With scientific caution, one may wonder whether the production

In Florida's wet prairies and bayous, commercial frog-hunters use flat-bottomed boats driven by propellers. Spearing the frogs, they can collect by day as well as night.

Herb Davies Photo

Enormous quantities of frozen frog legs are imported from Cuba and Japan particularly. This is the way they come to Abt & Lewis, one of the big importers, from Occupied Japan.

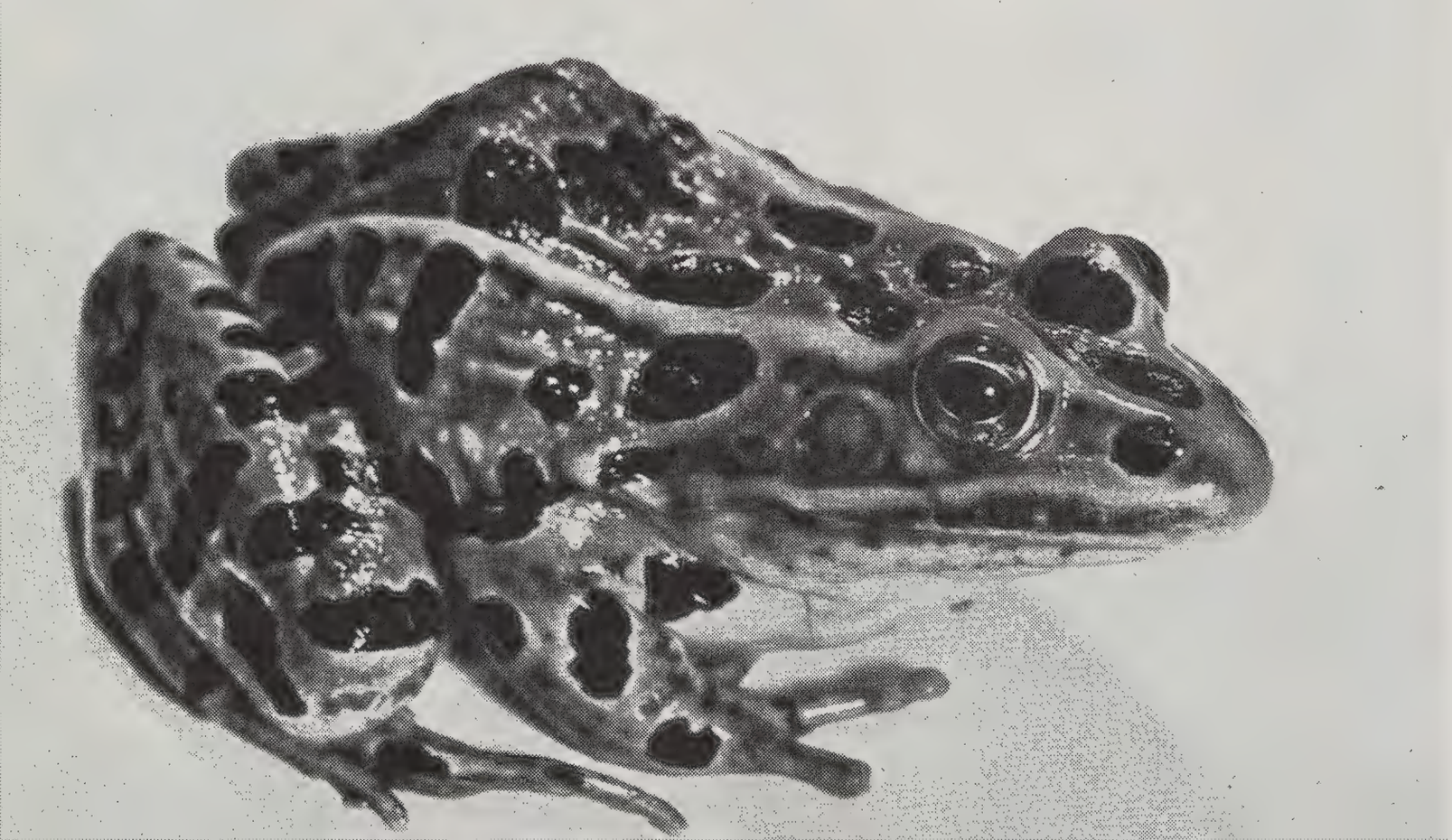
All frogs are carnivorous, and primarily insectivorous, with an almost unlimited capacity for food. Here a Neotropical Giant Toad faces a Zoo meal—a delectable dish of mealworms.

of the first sweet potato crop in many years and the first appearance of the giant toads in New Guinea were merely coincidental, but the finding of 110 cutworms in the stomach of one adult toad leaves little doubt concerning the toad's value.

Since 1934 a peculiar little frog from Africa has aroused considerable interest in medical men throughout the world. This is the African Clawed Frog or Platanna, *Xenopus laevis* (Daudin), the female of which can be used to diagnose human pregnancy. An accurate test has been sought for at least 4,000 years – the Egyptians had crude tests that were little better than an enlightened guess – but it is only within the past quarter of a century that any have been developed that give a high degree of accuracy.

The Clawed Frog test is based upon the unusual circumstance that the female frog carries eggs throughout the year but extrudes them only at mating or when artificially stimulated by an injection of one of the female hormones. In the early stages of human pregnancy large quantities of this hormone are excreted. A minute amount injected into the female frog will cause extrusion of her eggs.

In 1926 a somewhat similar test had been developed, involving the effects of the hormone on female mice, rats and rabbits. As shown by Abner I. Weisman and Christopher Coates, this mammal test requires more time and more elaborate procedures for verification, costs more and is no more accurate than that on the female Clawed Frog. Because of these advantages, many specimens of



The Leopard Frog is the most versatile frog in America. Its legs are edible, laboratories use it for comparative pathology, and it is readily available for the newest pregnancy diagnosis.

Xenopus have been imported from Africa and are raised in laboratories. Some conflict of interests thereupon resulted, for the Clawed Frogs are valued in Africa for their aid in controlling mosquitoes. Because of the demand for them in medical work, they have been nearly exterminated in some localities, much to the annoyance of the residents, who noted an increase in mosquitoes.

An even simpler and quicker test for pregnancy has now been discovered, utilizing the males of virtually any species of frog. In this test the injection of female hormones causes the toad to extrude spermatozoa within two hours. It has the advantage that local species of frogs can be used, thus reducing the cost of test animals to a minimum, and results are obtained in the shortest time for any of the pregnancy tests.

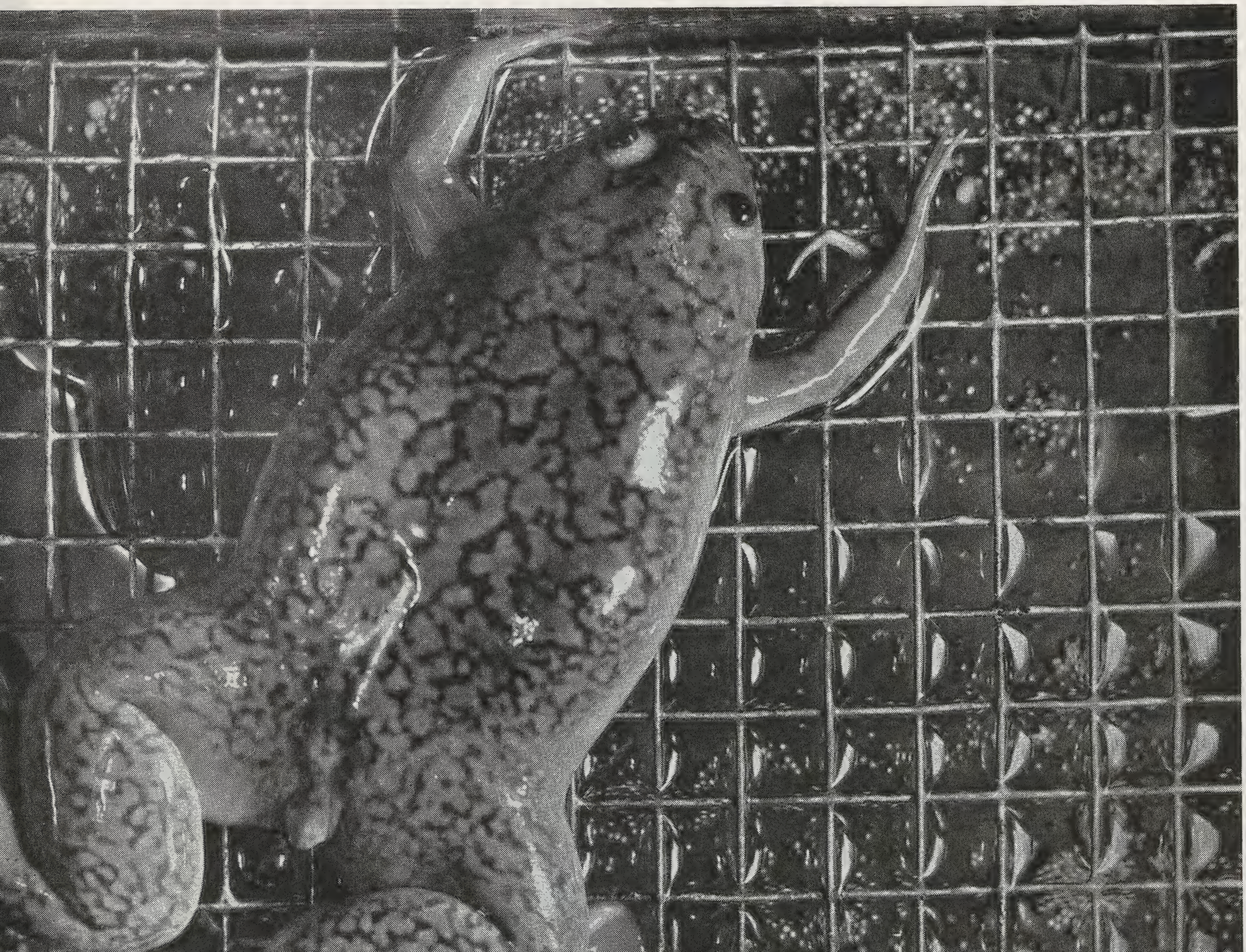
Since its discovery in 1947 by the Argentine investigator Galli-Manini, the male frog method of pregnancy diagnosis has been tested throughout the world and it has been found that with very few exceptions, any species of frog can be used. Laboratories anywhere can keep stocks of suitable local species. The frogs are not killed or injured and can be used again after a lapse of time. It would seem unnecessary to add that a species should be selected in which the males can easily be distinguished from the females without dissection — a condition not present in many species of frogs.

The male frog test has been developed so recently that it is impossible at this time to obtain a complete evaluation of it. According to most reports, it appears that it will become the standard test for pregnancy. In one series of more than 1,000 tests, the reported accuracy was 99.5%. Even allowing for the difficulties encountered by some workers, the results seem to be as good as or better than those obtained by the earlier methods.

Aside from pregnancy tests, frogs have played important roles in the history of many fields of science. They are one of the most frequently used animals in laboratory investigations in em-

Females of the African Clawed Frog have been used in pregnancy diagnosis since 1934. Here is a female on a spawning screen; her eggs are visible as tiny dots in the water beneath.

Lilo Hess Photo



bryology, endocrinology, physiology and anatomy. Most of our medical men today acquired some of their knowledge of anatomy from their early dissections of the frog. Even our early knowledge of electricity comes from experiments on frog's legs done in 1792 by Luigi Galvani – the source of the term "Galvanic current." The contributions to human knowledge that have been made as a result of laboratory studies of frogs are far too numerous to detail here. In the United States alone, millions of frogs, both alive and preserved, are sold annually for use in science laboratories.

Some two years ago a newspaper dispatch from Sydney, Australia, reported an air freight shipment of "giant toads" to England for research in the activity of the nervous system. These were our old friends, the Giant Neotropical Toads (*Bufo marinus*), which have been transported over most of the warmer parts of the world to aid man in his battle against insect pests. Starting from the Guianas in northeastern South America, they have been moved westward to Australia, and now farther westward from Australia to England – five-sixths of the way around the world. All that remains is for some investigator to carry some of these toads from England to the Guianas and they will have circled the globe in man's behalf.

Frogs as fish bait, frogs as pets – these are among the minor uses to which we have put this versatile animal. If, as I suspect, a certain amount of betting is involved, frogs are even used for gambling–in the jumping frog contests in California.

These have their origin, of course, in Mark Twain's classic tale of the celebrated jumping frog of Calaveras County. Every year in memory of this tale there is a championship frog-jumping contest at the Calaveras County Fair. The owner of the winning frog is awarded $200, plus a $1,000 bonus if his entry exceeds the record total for three successive jumps of 16 feet 4 inches, set in 1944 by a frog named "Maggie." Thousands of spectators gather to cheer on the amphibian contestants, which bear such names as "Zip In" and "Heliotrope." I do not know how restricting the rules of the contest may be, but perhaps some enterprising contestant will import one of the "Fly Frogs" from the Malay Peninsula and shatter all records.

Several other unusual and rather limited uses of frogs should be mentioned. The first of these involves a strikingly colored little frog from the American tropics, *Dendrobates tinctorius* (Schneider), often called the South American Poison Frog. The Indians of western Brazil, Colombia, Ecuador and eastern Panama use the poison secreted by the skin glands of this frog to poison arrows and blow-gun darts. The frog is stimulated to secrete the poison by holding it near or over a fire. The secretion is then scraped off and the arrows dipped in it. This poison, consisting of several different toxins, is quite virulent and produces cardiac paralysis. The Chinese have long used the toxins secreted by frogs, particularly the toads, for medicinal purposes. A commercial preparation of toad poison is sold in Chinese drugstores even today. The Chinese especially recommend it for toothache and bleeding of the gums.

There are even sacred frogs. Clifford Pope of the Chicago Natural History Museum, who has

Frog-jumping contests at the Calaveras County Fair in California are conducted under strict rules. The record for a series of three jumps is 16 ft. 4 in., set by a frog named "Maggie" in 1944.

Reshovsky: Black Star Photo

contributed so greatly to our knowledge of Chinese amphibians and reptiles, tells of a brightly colored little frog, *Rhacophorus dennysi* (Blanford), in southern China that makes a "clear, liquid sound suggestive of a flute." In the provinces of Kiangsi and Fukien a ritual has been developed for the worship of this little frog and it is sometimes carried around the town on men's shoulders.

Frog skin may never assume great commercial importance, but, surprisingly enough, it can be tanned into fine leather from which small articles are made. The Japanese appear to be the first to have used frog skins in this way. They usually tan only the skin of the toad, since it is thicker than that of most other frogs. With the recent development of the Cuban frog leg industry, the skin of the American Bullfrog has been utilized commercially in the production of small pocketbooks, wristwatch bands and the like.

Thus – by citing uses that range from pregnancy tests to tanned leather – we can justify the title of this article. But to avoid the charge of prejudice, we must admit that in some few situations frogs may make themselves undesirable. Around fish hatchery ponds they may constitute an important predator on fish eggs and fish fry. Occasionally frogs may eat beneficial insects. But these are unusual and generally minor blemishes on the character of the frog as a true friend of man.

A Warning to Amateur "Fish Doctors"

By JAMES W. ATZ

ONE OF THE ROUTINE TASKS of the Aquarium staff is to advise people who keep fishes how they may best treat their pets when they become ill. To those uninitiated in the joys and tribulations of fish-keeping, the idea of a sick Goldfish may seem incongruous, perhaps even ludicrous, but to the fish's owner it is usually a matter of genuine concern, with all the overtones of tragedy one might think would be limited to the indispositions of more demonstrative creatures such as dogs and cats. It is a rare day when the Aquarium does not receive a telephone call or visit from some worried fish fancier, inquiring what to do about an ailing Angel Fish or a tank of languishing Guppies.

The new "wonder drugs," the antibiotics, have proved quite efficacious in treating certain fish diseases and parasites, and the Aquarium has taken advantage of this in its recommendations for treatment. It is good, for example, to be able to prescribe a simple yet effective treatment like aureomycin for fungus and mouth-fungus – especially since the cure for these common disorders was, in the past, likely to be uncertain and the treatment dangerous to the fish.

Most of the powerful "disease killers" of the past were also detrimental to the animal. The problem has been to discover an agent that will effectively destroy or control the disease without killing the fish. Fortunately, some of the new antibiotics at least are not very toxic. Dr. Ross F. Nigrelli, the Aquarium's Pathologist, has tested Guppies with aureomycin chloride and found that concentrations as strong as three parts in ten thousand produce no appreciable toxic effects. Less than half that strength is necessary to treat fish diseases successfully, however.

It is fortunate that aureomycin is relatively harmless to fishes, because it is doubly important to administer an adequate dose whenever such antibiotics are used. Too weak a dose not only fails to cure the disease; it also encourages the development of drug-resistant strains of disease-producing organisms. Not realizing that they

were dealing with a double edged sword, fish fanciers have carelessly administered antibiotics to their pets or have indiscriminately used them even when their fishes were not sick – apparently on the supposition that what is beneficial to a sick fish must also be helpful to a healthy one. Aquarists have been encouraged in these dubious practices by the availability of fish foods and medicines containing concentrations of antibiotics far below the effective and safe therapeutic level.

Dr. Nigrelli is quite concerned over the possibility of creating strains of disease-producing organisms that will be able to resist high concentrations of aureomycin, chloromycetin and other antibiotics. Already their casual use has made the problem of diagnosis increasingly difficult. Fishes suffering from certain disorders that have been treated with inadequate doses of antibiotics still show symptoms of the disease, but these are so distorted that they are practically unrecognizable. A whole new set of identifying signs must now be learned in order to encompass those instances where sick fish have already been given treatment by antibiotics. If and when drug-resistant diseases appear in aquaria, the successful maintenance of fishes in captivity may well be more difficult than it ever was before the advent of the so-called wonder drugs.

Three Instances of Tangled Squirrel Tails

By ROBERT M. McCLUNG

Animals in the wild often become imprisoned by various types of natural traps or snares. Spider webs are a good example of these, with insects, of course, as their primary victims. However, small birds, mammals and even snakes have been known to be trapped by them. The water-filled, flask-shaped leaves of the Pitcher Plant is another example of a natural insect trap. The oozing gum or sticky sap of various plants are often effective traps for insects, and there are many instances of small animals having been caught by burrs or impaled on thorns. But until lately we had never heard of such strong and active creatures as squirrels being trapped by having their tails knit together by natural causes. Not one, but three, instances of this peculiar accident have recently come to the attention of the Zoological Park staff.

The latest occurred on the morning of December 31 when one of our keepers noticed seven Gray Squirrels huddled closely together on the ground at the north end of the Zoological Park.

Seven Gray Squirrels, just as they were found in the Zoological Park, with their tails inextricably knotted together. Two were dead and another one succumbed a short time later.

Spanish moss was apparently the chief villain in this unhappy triangle — three Gray Squirrels found in South Carolina with the hairs of their tails matted and tangled in a wad of moss.

Their bodies extended in different directions and they seemed to be bound by their tails so tightly that any coordinated movement was impossible. They were netted and taken to the Animal Hospital, where the photograph that accompanies this note was made by an amateur photographer.

Close examination at the Hospital revealed that the seven tails were tightly tangled and knotted together like twisted strands of twine. Individual hairs were matted and interwoven to such an extent that a great deal of fur had to be cut away in order to separate the animals.

All seven squirrels were adults. Two of them, both females, were dead when they were picked up and another was so weak that it died the same day. The other four, once released, were able to scamper away under their own power. They were slightly wobbly and their tails were ragged, but otherwise they seemed little the worse.

From their general condition, it would seem that they had been tied together for several days.

We have no way of knowing actually how the squirrels became entangled, but a possible explanation comes to mind. Many trees in the Zoological Park contain bulky leaf nests or holes in the trunk which are inhabited by Gray Squirrels. Often several individuals live in the same nest, sometimes an adult female with several of her grown-up young of the preceding summer. The nest is their home base, used for sleeping and for shelter during bad weather. Presumably these seven all lived in the same nest and their tails became entangled as they curled up together and stirred and burrowed under each other for additional warmth and shelter.

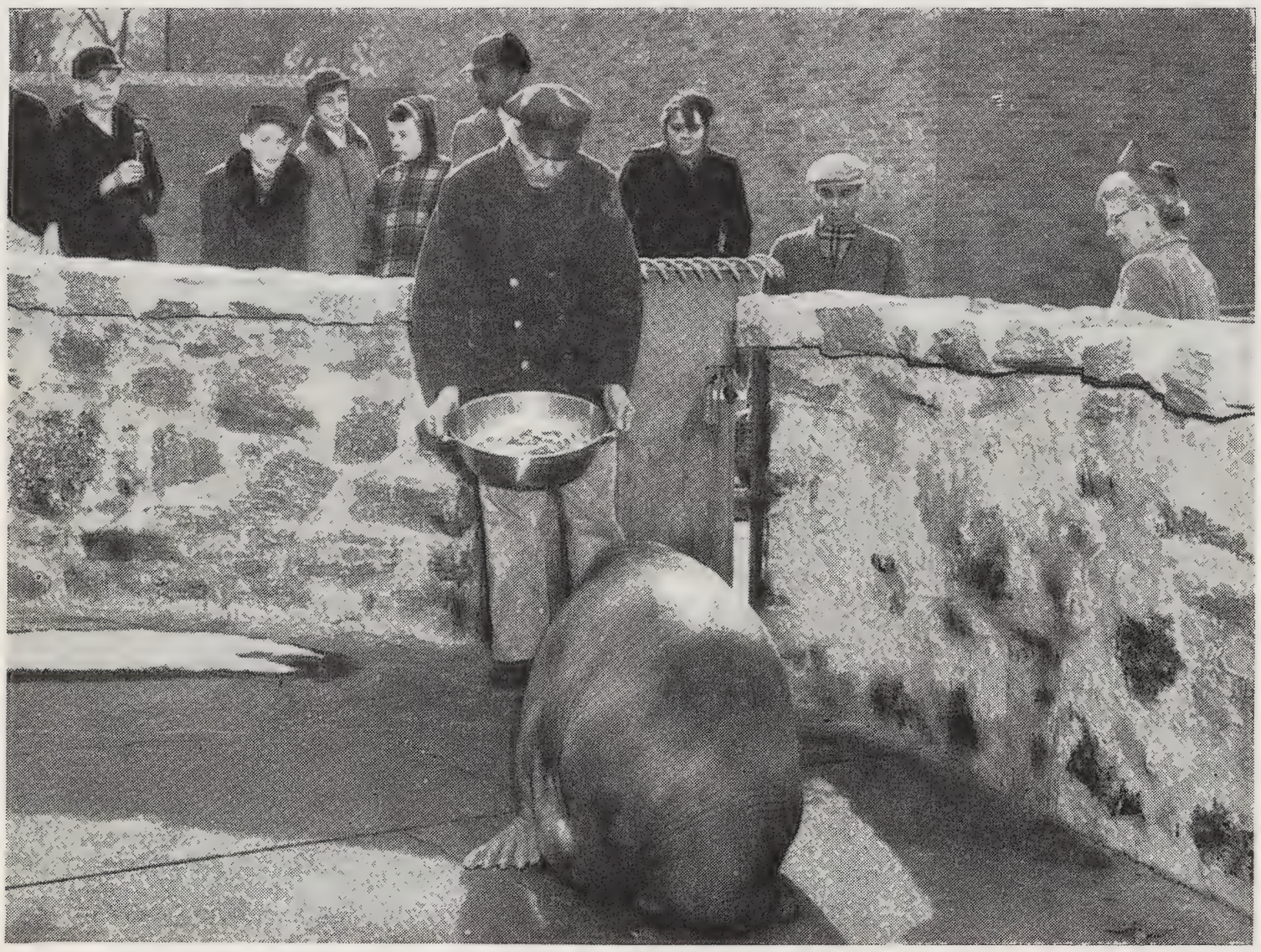
It may be significant that the week preceding the discovery of the seven was damp, with much rain and some snow. Possibly the squirrels returned from foraging for food with their tails wet, which might make matting easier.

A similar occurrence in the Zoological Park was reported early in December by Head Keeper Scott of the Bird Department, who found five Gray Squirrels tail-tied on the lawn in front of his apartment in the Park. He separated them and they ran off with their tails considerably frazzled.

These two instances within a few weeks of each other reminded Staff Photographer Dunton that in late March, 1948, while he and Brayton Eddy, our late Curator of Reptiles and Insects, were collecting near Switzerland, South Carolina, they found three squirrels whose tails were not only matted together but were additionally tangled with Spanish moss. The moss is used by squirrels of that area in the building of their nests and would, of course, be an excellent contributory factor in tail-tangling. Here, again, the weather had been very damp in the period before the squirrels were found.

The Carefree

EVER SINCE he came to us by air
Atlantic Walrus has engaged the
do with him. His astonishingly rapi
pounds in mid-March — is matched b
natured and more playful he seems to
we don't know. Certainly adult Walr
now is. But trouble is a long time c



As Keeper Solanto comes through the gate with his pan of fish, Herbert is right there waiting.

Give him half a chance and he'll have his head in the pan before Solanto puts it on the ground.

ife of Herbert

Photos by Sam Dunton

nmark last October, Herbert the baby
s of everyone who has had anything to
— from 240 pounds on arrival to 427
position; the fatter he gets, the better
How long this state of affairs will last,
not likely to be as confiding as Herbert
ert will be only one year old in May.

At some moments Herbert is less attractive than at others. This is not his most engaging moment.

Some day that tiny, baby tusk, now scarcely an inch long, will be a formidable 18-inch weapon.

His hind flippers comfortably crossed, Herbert relaxes all over when he takes a morning nap.

1. The beginning of the daily game. Herbert lies on his back and the keeper begins to push.

2. Over and over he rolls, down to the water's edge, and with a last heave and a mighty push—

3. Splash! And Herbert has made a big dent in the pool. Usually he comes right back for more.

Coming from Ecuador: Giant Hummers and Another Mountain Tapir

EDITOR'S NOTE: Charles and Emy Cordier, the animal collectors who have brought the Zoological Society so many rarities from South America and Africa, and who are now operating as free-lance collectors, are expected back from Ecuador this spring with another magnificent collection.

Earmarked for us is a young male Mountain Tapir as a potential mate for the female we obtained through the Cordiers two years ago. Our "Panchita" was the first living specimen ever exhibited and now, within two years, we hope to have not only a second one, but a mate! It is zoological luck that comes but seldom.

Birds are the Cordiers' specialty, and they have a very special bird for us: *Patagona gigas*, the Giant Hummingbird, largest of all the hummers, 8½ inches long. It, too, will be a "world first."

The account that follows is extracted from a letter by Emy Cordier, telling some of the difficulties of collecting and keeping their birds and mammals. The Cordiers reached Quito on August 5 last and were fortunate in finding the carpenter who had made cages and special equipment for them on their previous trip in 1950. They were able to settle almost immediately in a comfortable house in the shadow of Mt. Pichincha, surrounded by the snow-capped ranges of the Andes. Best of all, the house had a large, walled garden, which was ideal for animal-keeping. By September 2 their Quito home was fully equipped as a base camp and they set out down the slopes of the Andes toward the Rio Negro, in search of brilliant tanagers and the lovely Apricot Cock-of-the-Rock. Emy's story picks up at this point.

By EMY CORDIER

NEARING THE VILLAGE of Ambato, where nearly everything had been destroyed by the earthquake two years ago, we are glad to see that most of the buildings had been rebuilt and the people looked more cheerful. Our own cheerfulness began to disappear after that point, however, for in these parts the earth is loose and crumbly, the roads are bad and landslides are a daily occurrence.

In one place we had to wait a long time for a landslide to come to an end; there was no possibility of continuing while boulders and enormous masses of soft earth were slipping across the road. A party of Indians with heavily-packed mules was halted on the other side of the landslip. I saw one of the Indians kneel and pray, and then when the slide was momentarily halted he sent his mules across, with a sharp push, while he stayed behind and continued to pray. We, too, ventured across and made it without mishap.

The road was little better further on. Waterfalls splashed on the road and turned it into a riverbed. There were deep gorges that made me almost dizzy. In some places the floor of the road had given way and it was a matter of going through or around enormous holes. The only happy moment of the journey came when my eye caught something white and I exclaimed "I think I see white orchids!" Charles stopped the truck, and picked some. A little further on there were mauve orchids on the trees, and we picked more, so that I arrived at our destination at the

Rio Negro as orchid-hung as if I were going to the opera.

In this part of the world where not very much ever happens (except an occasional earthquake), any unusual incident is remembered a long time. Thus, when we arrived at the Rio Negro about 6 p.m., two young men came running to the car. They stopped: "It is the señor of the birds!" one of them exclaimed. They remembered Charles from his visit to their neighborhood two years ago.

Since they were boys that had done some tree-climbing for Charles, and knew what he wanted done, we are as glad to see them as they were to see us. They found temporary quarters for Charles and me, and Elsa, the girl I had brought along from Quito as cook. Next day Charles rented an almost-completed new hut that the enterprising storekeeper had built. It was only a two-room cabin, barren and partly unfinished, but there were a few boards still lying around and they served to make a kitchen table. Putting up the table, moving in our cots, and so on took place with about twenty unemployed villagers standing around in complete silence to watch every move. I for one was glad when darkness came and gave us an excuse to shut the door.

Charles and the two boys left early the next morning to see what the forest offered in the way of birds, and I busied myself making the hut livable, but especially in setting up cages so as to be ready when the first birds arrived. It was well that I did so, for Charles began to bring tanagers almost immediately. Then a lovely Pheasant Cuckoo was tossed in my lap; it had to be hand-fed every hour. Next came a tiny woodpecker, "Piculet," which Charles had longed for years to catch.

Within three days after arrival I was as tied down to my bird-housekeeping as it was possible to be. I looked out of my low doorway toward the towering green forest where Charles disappeared every morning, and thought somewhat ruefully, I must admit, of Charles' promise to take me into the woods and show me the display grounds of the Cocks-of-the-Rock as soon as he found a good one not too far away. I was pretty sure I was not going to get away from my daily duties long enough to see that extraordinary sight.

Elsa, the cook from Quito, was a tireless worker – but completely unable to do the simplest task without direction. The kerosene stove was her greatest problem and I really doubt if she would have learned how to light it if we had stayed there for years. As it was, every lighting was an adventure, a fire hazard and the occasion of five to fifteen minutes oratory and instructions by me.

The Pheasant Cuckoo and "Piculet" were insectivorous and required supplies of fresh meat and eggs. Don Alberto, the owner of our hut and of the only general food store in the hamlet, explained that he used to get fresh meat every day—but now, unfortunately, supplies came only every other day. A little later it was every two or three days. Eggs could be bought by twos and threes by making the rounds of the four stores and usually you had to buy a lot of things you didn't need in order to possess the entire stock of eggs.

We had scarcely settled in the village before Charles came down with malaria and the rains began. Charles kept going – he had to – but it was very bad at night. The roof of the bedroom leaked in a dozen places. I slept and wakened, slept and wakened, getting up to move my cot from one leaking spot to another that like as not would leak before morning. Charles was too ex-

hausted to care, so I spread a plastic cover over him and rigged an umbrella over his head.

The rains continued for the better part of the twenty-four days we spent in that cabin. Once, I remember, there was half a day of weak sunshine. Everything got a brief drying, there was a beautiful red sunset that I watched through a notch in the mountains, and I thought maybe the rains had stopped at last. But they started again before daybreak.

In mid-September I, too, came down with malaria and for five days could eat nothing. To make matters worse, three Cocks-of-the-Rock were caught and brought in. They had to be hand-fed all day long and I have never known such savage birds. Every attempt to feed them left both of us with bleeding hands and arms. Finally I got to the point where I could take no more, but directed the feeding and watering as best I could from my bed, while Charles took care of the collection and then dashed off to the forest for more birds. The rains had slackened enough so that the weather was perfect for capturing the gorgeous Apricot Cock-of-the-Rock and it was now or never.

A few times I wondered whether I was going to leave the Rio Negro alive. Eventually I did begin to mend, but by that time we had all the birds we wanted from that region and it was time to go back to Quito. I was still too weak to climb the mountain sides to get to the display grounds of the Cocks-of-the-Rock, and so the closest I got to the forest was my door yard, from where I could see the silvery ribbons of waterfalls on the mountains and the occasional flash of distant wings.

A day of packing – and then at 6 p.m. we left the Rio Negro to drive through the night to Quito. There were still landslides, but they were fewer, and the journey was uneventful until we approached Quito over the great pass. The load on top of the truck began to slide forward. Charles climbed on the hood of the truck and pushed; the rest of us pulled; the load slid back into place. Three times that happened, and the last time the road was so steep that there was no use pushing; Charles turned the truck around and the load slid back of its own weight. We rolled into Quito at 3 a.m. The cook helped us unload. We watered the birds, unpacked the cots and lay down for three hours' sleep. Then it was time to get up and resume the feeding schedule.

* * *

The life of an animal collector – at least, of an animal collector's wife – is a great deal easier in a base camp such as we had set up in Quito. At least there are food supplies close at hand, and additional help can be obtained if it is needed. Even cook troubles disappeared at last, for I found an Indian boy with long shining black hair who is neat, quick, clean, willing and amiable. Little by little the base camp staff was improved until it was possible for me to go away for very brief periods with fair certainty that the

A reliable staff to take care of the animal collections is of the utmost importance and the Cordiers have developed a good team at their Quito headquarters.

Margaret Speck Photo

The Giant Hummingbird of the Andes is truly a giant — 8½ inches long exclusive of its beak. No one has previously exhibited this largest hummingbird alive.

Margaret Speck Photo

Panchito, the new Mountain Tapir, is such an active creature that a high fence is necessary.

Margaret Speck Photo

collection would be maintained while I was absent.

Thus, when Charles came back from the desert in the late afternoon of November 13 and said that he had found the feeding place of the famous Giant Hummingbirds, *Patagona gigas,* it was possible for me to plan to go with him the next day. Although snow-capped mountains surround Quito, and steaming jungles lie down the slopes of those mountains, the desert is only an hour away by automobile. I felt that I could safely take the time to go and see one of the great prizes of the expedition in its native habitat.

We set out at 4 o'clock in the morning, over a mountain road that turned endlessly. We passed sleeping villages, now and then an Indian trudging toward Quito with a back-breaking load of clay pots. The mountains above us were still hung with fog.

Then, suddenly, we were in a sandy waste and amid the most beautiful cactus garden I have ever seen. Cactus was abloom, low bushes were aflame with blue, yellow and white flowers, and lantanas flourished in the shade of low trees. Below and beyond, in the valley, there was a broad and noisy river, the bathing place of the giants that fed on these cactus flowers.

Charles prepared his limesticks hurriedly, so as to have them ready before the sun broke through the dawn clouds. There was still not a bird to be seen but as daybreak came the birds came with it, one here, one there. A hummingbird whizzed by; I knew it from previous collection trips; it was a Violet-ear. A moment later two large hummers, startled by my movements, zoomed up into the sky with a high, fine whistle. "Those are the Giant Hummers," Charles said, and I watched them until they were mere pinpoints.

To our disappointment, the sun that had given such early promise never did really come out and a fine drizzle set in. Nevertheless, it was important to study the habits of the hummingbirds and for an hour I sat under an immense cactus in the mist and watched for signs of *Patagona gigas.* One finally came; it perched on a tall yucca momentarily, then darted downhill in fast sweeps, stopping in mid-air to feed on the flowers of seven different cactuses.

It was no use to wait longer and at 4 o'clock we returned to Quito, only to be back at the feeding grounds at daybreak the next day. This time the sun came boiling out and by two o'clock in the afternoon we had our first Giant Hum-

mingbird, captured with a cleverly placed lime-stick.

Charles loosened the stick from the bird's wings with the utmost care and we all but ran to the truck so as to get inside where the bird could not escape if it flipped out of Charles' hands. It was oven-like in the cab of that truck after hours of standing in the sun, but that made no difference. Charles cleaned the sticky lime from the wings with a bit of cotton moistened with gaso-

Being a hand - reared animal, Panchito is as friendly and affectionate as a puppy. Mrs. Cordier soon found she was neglecting her work to play with Panchito.

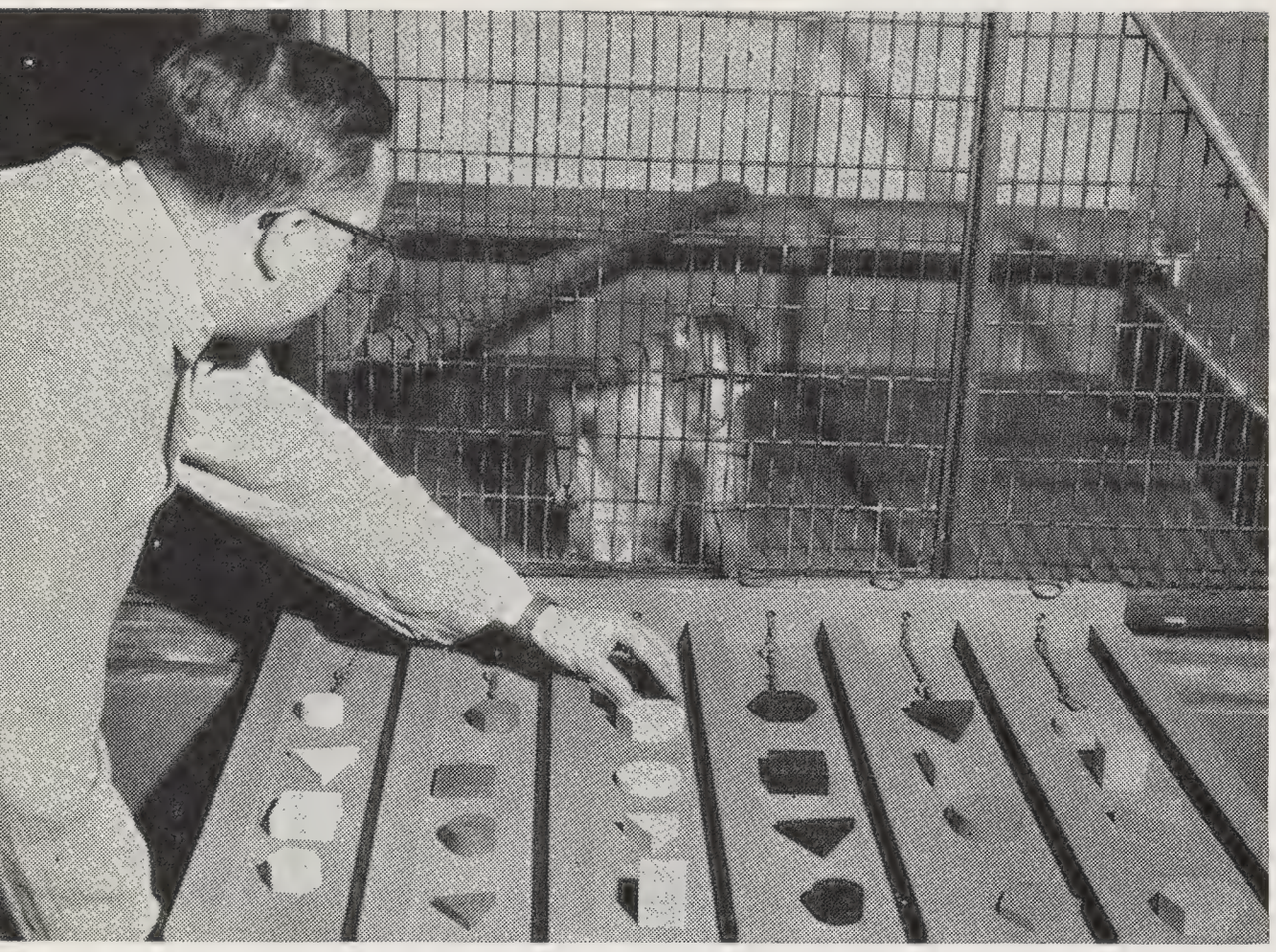
Margaret Speck Photo

line, and then offered a vial of honey water. The hummingbird drank greedily and Charles popped him in a small cage covered with white cloth. We headed for home. There are more Giant Hummingbirds in my "living room aviary" now, but none of them were as thrilling as that first one, for this is the largest of all the hummingbirds and no one has previously managed to bring it out alive. Of course, we are still in Ecuador as I write this, and it is a long way to the Bronx Zoo, but the giants are feeding so well, and are seemingly so contented, that I feel reasonably sure these will get to New York in good condition.

The other great moment so far was when Charles got word that the hunters had caught the young Mountain Tapir we wanted. Charles left immediately to get the animal, and the first I knew of his return was when I heard the cook and the carpenter scream about noon. Charles was striding up the walk with the striped little animal in his arms – and the cook and carpenter thought he was carrying a "tiger," as they call the native jaguar.

"Panchito," as the baby was named, was as gentle as a lamb but as inquisitive as a dozen animals. The moment Charles put him down he pattered about, sniffing everything, investigating the house from kitchen to bath. Charles enjoyed the fun until Panchito began nibbling at his bird nets and then he chased him out into the yard. My garden began to suffer and the plants I had brought back from the Rio Negro and the desert were quickly nibbled to the ground. It was my turn to complain, and Panchito was chased into an unused shed at the side of the house until boards could be obtained and a kind of corral made for him in the yard. We brought hay to make a soft bed, tried him on a dozen foods until his favorites were determined, built him a little wading pool – in short, both of us pampered Panchito and I at least spent so much time playing with him that I began to neglect the precious birds.

There are so many birds and miscellaneous animals now that I have little time for Panchito, but he is still my favorite and I shall be very sorry to say good-bye to him when at last we turn him over to the General Curator of the Zoo. But, of course, Panchito will not miss me, for at the Bronx Zoo he will find a friend – young Panchita, the only other Mountain Tapir in any Zoo.



Rhesus Monkey is being trained in e selection of yellow objects from series containing 6 different colors.

Jack Layer — Journal American Photo

Animal Learning—

An Ancient Speculation and a Modern Science

By JOHN V. QUARANTA

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THE DIFFERENCES AND SIMILARITIES in the learning processes of human beings and animals have preoccupied speculative thinkers and scientists, alike, for a very long time.

Plato (427-347 B.C.) was among the first to distinguish sharply between animal behavior and human behavior in terms of an ultimate causative principle, which he called "the soul." This distinction bears directly on the problem of human and animal learning and is worth noting.

According to Plato, the soul of man is divided into three parts: the passionate soul, the nutritive soul and the rational soul. Animal souls, on the other hand, are capable of only two functions: passion (or feeling) and nutrition (or growth).

Thus, in Plato's scheme, only man is capable of reasoning.

The contributions of Aristotle (384-322 B.C.) to philosophy are well known, but less familiar are his pronouncements on comparative psychology and biology. Nevertheless, the body of them is respectably large: "The Natural History of Animals," "On the Anatomy of Animals," "On the Motion of Animals," "On the Gait of Animals," "On the Reproduction of Animals" and "On the Soul." In these various works Aristotle argues for the importance of studying animal behavior, likens human personality in many ways to the characteristic habits of certain species, and proposes once again Plato's soul theory. The theory is considerably amplified in "On the Soul," but for Aristotle as for his teacher, man alone is capable of intellection; man alone can think and will.

During the medieval period, the philosopher-theologian Thomas Aquinas grappled once again with the comparative differences and similarities of men and animals. In his own "On the Soul" and in "The Treatise on Man" (in the "Summa Theologica") and in "The Treatise on Truth" (in "Quaestiones Disputatae") he set forth what might be called a modified Aristotelian view. He allowed for sensory-motor learning in animals, primitive insight (his own phrase is "estimative power") and memory for sensory events.

For Aquinas, the animal was more than a mere automaton, more than a mere complex of stimulus-response bonds. For him the animal was capable of responding relationally and meaningfully to the environment. The philosophic influences of Aquinas were later to find their empirical counterpart in the work of the Gestalt psychologist Wolfgang Kohler.

Finally, Aquinas emphasized that only man is capable of symbolic abstraction, or thinking with symbols – the ability to use mathematical symbols or language symbols.

What we might call the modern period in comparative psychology began with G. J. Romanes.

As R. H. Waters has pointed out, "His books, 'Animal Intelligence,' (1882), 'Mental Evolution in Animals' (1883) and 'Mental Evolution in Man' (1888), form a trilogy bearing particularly on the evolutionary doctrine as applied to mental traits."

Romanes has been criticised for his use of the anecdotal method in his scientific attempt to describe and interpret the behavior of animals. Even so, it does not weaken his contribution to comparative psychology.

Romanes' work may be regarded as the transition from *speculative* study of animal behavior to *naturalistic* study.

With Darwin, Romanes argued against qualitative differences, or differences in kind, between men and animals; the difference is one of degree. The thesis of the Darwin-Romanes school is simple: the psychological activities of man have their analogous counterparts in the psychological activities of animals. In terms of intellectual activity, this means that men and animals are capable of performing essentially the same kind of tasks.

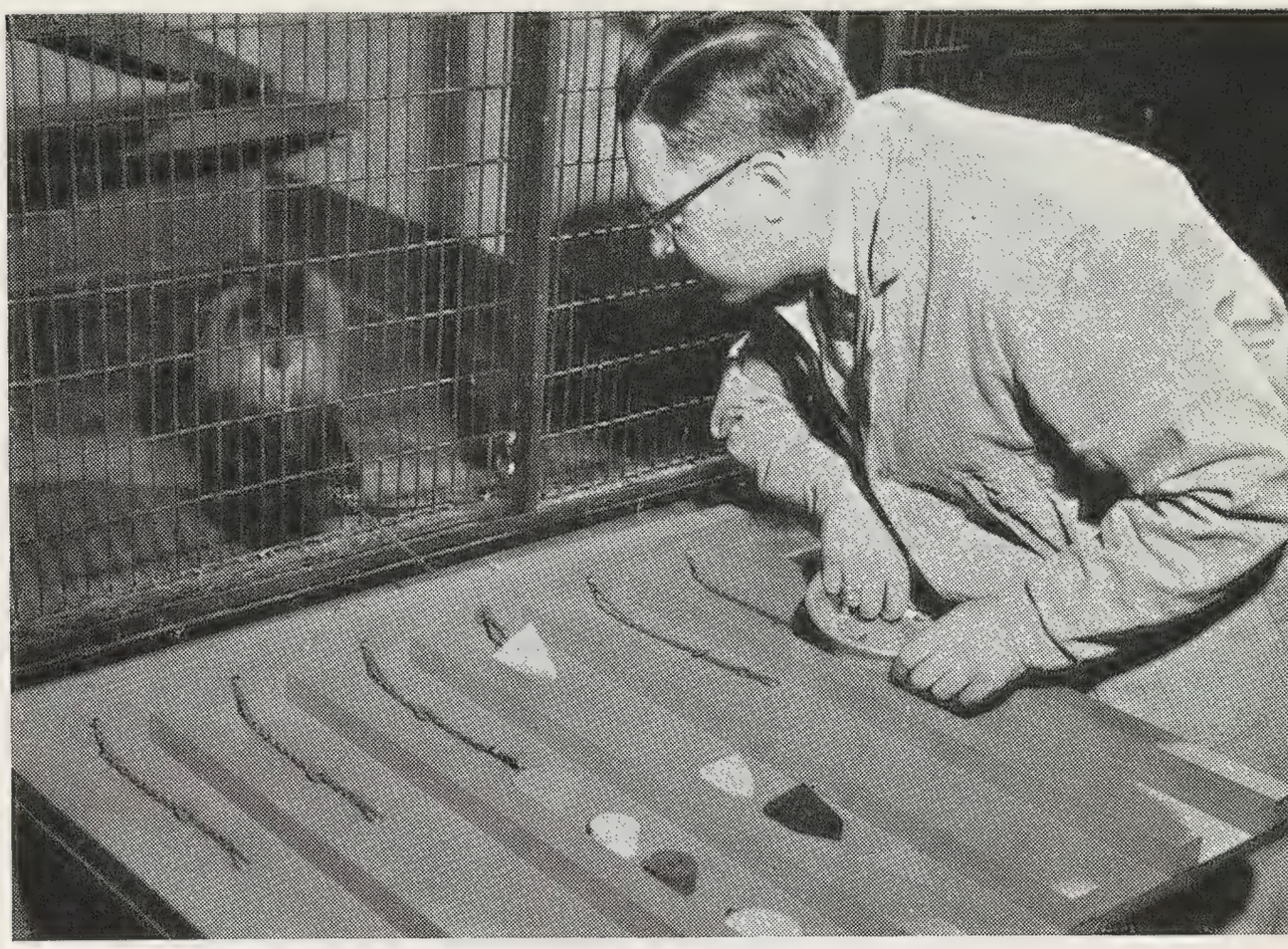
The scientific period of comparative psychology finally came fully into its own with the work of C. Lloyd Morgan (1852-1936). From the standpoint of scientific methodology, Morgan's most significant work is his "Introduction to Comparative Psychology" (1894). Here he stressed the importance of avoiding human interpretations of animal activities and of attributing too much mind to the animal. This warning was formulated in terms of a canon and may be stated thus:

"In no case may we interpret an action as the outcome of the exercise of a higher psychical faculty, if it can be interpreted as the outcome of the exercise of one which stands lower in the psychological scale."

Other great names in the early history of comparative psychology are Jacques Loeb (1859-1924), H. S. Jennings (1868-1947), John Lubbock (1834-1913), Margaret Floy Washburn (1871-1939), E. L. Thorndike (1874-1949), R. M. Yerkes (1876-), I. P. Pavlov (1849-1935) and Wolfgang Kohler (1887-).

* * *

Modern scientific work on human and animal learning may be summarized under three headings: trial-and-error learning, insightful learning, generalization-and-concept formation.



The problem facing this Wanderoo discrimination between triangles whatever color or size, and the circle

Jack Layer — Journal American Pho

Trial-and-error learning is the method by which the learner seeks in a random, unplanned way for a solution.

All learning is defined by the psychologist as the modification of one's reactions through experience. A more technical definition would have it that learning consists of any change in behavior which is acquired as a function of practice and which has a direction that satisfies the prevailing motivational state of the organism. All this means, more simply stated, that in order to learn effectively one must be disposed to learn, and that performance is changed by practice, and improved by practice.

In the trial-and-error method, a variety of solutions are tried in the beginning. Some succeed, some don't. Eventually successful solutions outnumber the unsuccessful ones, and the task is considered to be "learned."

Trial-and-error is illustrated in the animal by the performance of a rat in a maze, seeking to find his way to freedom or food. In human beings it may be illustrated by the history of an invention. First attempts are usually unsuccessful or at least inadequate but cumulative efforts finally result in successful and adequate solutions. The story of man's attempts to fly and the invention of the airplane is typical.

The ability to learn is pre-eminently a characteristic of the human being, but trial-and-error

learning is present in varying degrees in animals ranging from insects up to the highest anthropoids. William Morton Wheeler describes an experiment by Wasmann in which the latter succeeded, in a few days, in training worker ants of *Formica rufibarbis* and *Formica fusca* to come for food to his finger, from which they had at first fled. Ernst (1905) obtained similar results from a *fusca* worker, which he taught to emerge from a test tube and take food from his finger while it was in motion.

Contrasted with trial-and-error learning, insightful learning is sudden, total and deliberate. Trial-and-error is gradual, progressive, random and undeliberate. An insight is a sudden "seeing into" a problem, a sudden grasping of a relationship, an intuitive perception of the means available for solving a given problem and their feasible application to the required solution.

Insightful solutions are particularly characteristic of human beings but they are also present in infra-human mammals, especially the anthropoids. Kohler's work may be cited with profit; here is an excerpt from an experimental study of insightful learning in Chimpanzees:

"This time Sultan is the subject of experiment. His sticks are two hollow bamboo rods, such as the animals often use for pulling along fruit. The one is so much smaller than the other, that it can be pushed in at either end quite easily. Beyond the bars lies the objective, just so far away that the animal cannot reach it with either rod. They are about the same length. Nevertheless, he takes great pains to try to reach it with one stick or the other, even pushing his right shoulder through the bars."

The experiment was continued for about an hour, and then Kohler discontinued his observations, feeling that the animal was incapable of solving the problem of reaching the objective outside the bars. The experimenter left the room, but was recalled a few minutes later by an attendant. This is what he then saw:

"Sultan is squatting at the bars, holding out one stick and, at its end, a second bigger one, which is at the point of falling off. It does fall off. Sultan pulls it to him and forthwith, with the greatest assurance, pushes the thinner one in again, so that it is firmly wedged, and fetches a fruit with the lengthened implement. But the bigger tube selected is a little too big, and so it slips from the end of the thinner one several times; each time Sultan rejoins the tubes immediately by holding the bigger one towards himself in the left and the thinner one in his right hand and a little backwards, and then sliding one into the other. The proceeding seems to please him immensely; he is very lively, pulls all the fruit, one after the other, towards the railings, without taking time to eat it, and when I disconnect the double stick he puts it together again at once, and draws any distant objects whatever to the bars.

"The next day the test is repeated; Sultan begins with the proceeding which is in practice useless, but after he has pushed one of the tubes forward with the other for a few seconds, he again takes up both, quickly puts one into the other, and attains his objective with the double stick."

In human experience, insight may be illustrated by the "eureka" incident attributed to Archimedes, or by the rush of excitement of the mystery story devotee who has suddenly realized who the murderer is.

In comparing the process of insightful learning in human beings and animals, it may be said that human beings are apparently capable of solving more complex problems through insight than animals are, and are able to benefit, furthermore, by imaginative and logical rehearsal which makes it possible to develop tentative solutions away from the scene of the problem.

As for abstraction and generalization, the capabilities of human beings are familiar to us all. Take, for example, the numerous mathematical theorems and propositions which apply to an almost infinite number of cases. The dictionary definition of a triangle applies to all possible triangles: "A figure, especially a plane figure, bounded by three lines, called sides, and having consequently three angles."

Human beings readily and easily and constantly think in terms of abstractions and generalizations, but what about animals?

Is an infra-human animal able to abstract from a number of somewhat similar objects an element or several elements to which it will learn to make a reaction, in such a way that if it is presented with a new set of objects containing those elements, it will react as it did in the training situation?

Various experimenters have approached this problem and currently, at the Zoological Park, I have been running a series of tests on a male Rhesus Monkey and a female Wanderoo Monkey to check the results of others with a variety of experimental animals.

The Wanderoo was trained to select a triangle from a set of geometric forms which included a square, a circle, a semi-circle, a paralellogram and a hexagon. Once the selection of the triangle became a matter of routine, the monkey was tested for her ability to select triangles from three sets

of geometric forms which were similar to the first set but not identical with it. (The differences were in color, size and thickness).

From these three sets of forms the Wanderoo selected triangles on a mere chance level of efficiency.

Next, the animal was given intensive training with the first and three subsequent sets mingled, until the efficiency level was almost perfect. At that point the now-familiar triangles were replaced by entirely new triangles – different in color and angularity.

Significantly, performance was now statistically better than chance, although the monkey's best performance was in selecting triangles most nearly like the original ones, and its poorest in choosing triangles quite dissimilar to the first ones.

The inference to be made from this experiment is that the all-inclusive and highly selective process of abstraction did not occur, but that generalization based on sensory similarity *did* occur.

Results with the Rhesus Monkey supported those obtained with the Wanderoo and together they essentially substantiate the work of Gwen Andrew and H. F. Harlow.

On the basis of experimentation with sixteen Macaque Monkeys, these workers concluded:

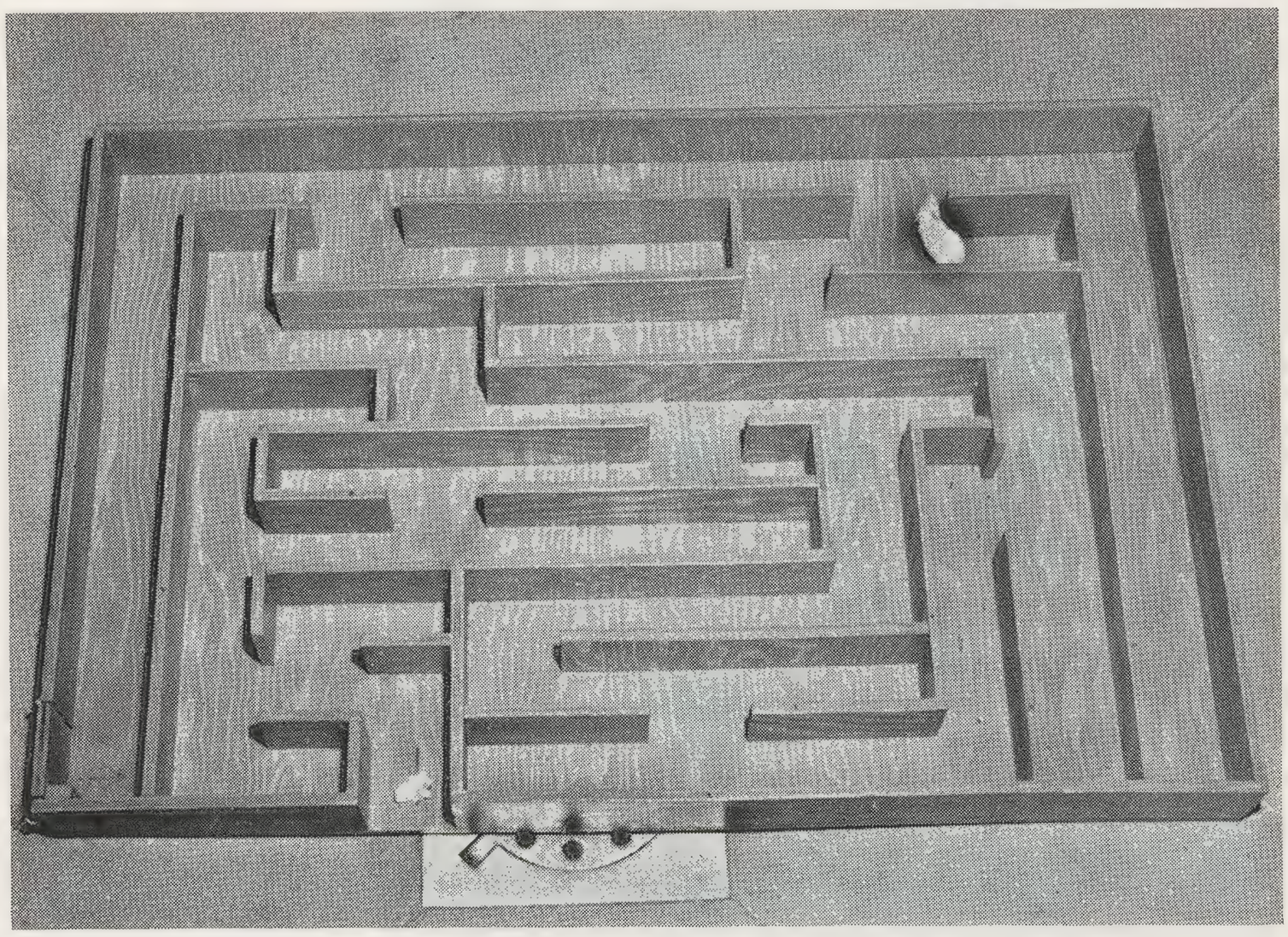
"The concepts that underlie the thinking processes of the human being are characterized not only by the breadth or extensivity of their generalization but by their high degree of selectivity. This is attested by formalized dictionary definitions of words that have conceptional significance.

"All the existent studies of the concept of triangularity have been designed to show that subhuman animals could respond to triangularity in situations in which none of the stimuli would fit the dictionary definition of a triangle."

To summarize the differences between human and animal learning:

1. Both human beings and animals are capable of trial-and-error learning.
2. Both human beings and animals are capable of insightful learning, but insightful solutions by human beings may be distinguished from those of animals in two ways. First, human subjects can cope with more complex problems. Second, the human subject has the advantage of imaginative and logical rehearsal which makes possible the formulation of tentative solutions away from the scene of the problem.
3. The evidence strongly suggests that animals are capable of sensory generalization. Human beings are capable not only of sensory generalization, but of abstraction. This latter process is more highly selective and more inclusive.

Some other differences have been suggested by various experimenters – that man is a better observer than an animal, noticing many characteristics of things, people and situations that lie beyond the animal's scope; man employs more planning, management and control in working out a problem; man uses symbolic processes in learning, such as numbers, names and language.



This is the standardized maze used to measure trial-and-error learning in rodents. The animal is introduced at the lower left, and there is only one exit.

News from the Conservation Foundation

Harvard Plans to Continue Conservation Seminar

That the Conservation Seminar inaugurated at the beginning of the fall term of 1950 at the Littauer School of Public Administration at Harvard may be carried on as a somewhat continuous activity has been indicated at recent meetings with Harvard faculty members. Starting as a one-year course under financial sponsorship arranged by the Conservation Foundation, this seminar was continued with our help into the 1951-'52 college year. Harvard now signifies a desire to set the course up on a 20-30 year basis with substantial financial backing.

At a conference early this year with Acting Dean C. R. Cherington of the Littauer School, together with other professors active in the course, the plan for projecting this seminar into the future was discussed in great detail.

During its first two years, Fellowships in the course have been limited to qualified persons in government service. If it is carried on as now contemplated, it is planned that additional Fellowships would be provided for men coming from business and industry as well. Littauer School heads have been greatly pleased with the interest in the course shown by the cooperation of the Harvard Law School, and would hope for a similar enthusiasm from the Harvard School of Business Administration, with a further ambition to develop conservation interest at Harvard by the inauguration of special undergraduate courses.

Our friends at Harvard have asked the Foundation to work with them in raising the rather large sum needed to carry this seminar forward on the new plan.

Yale, Too, Expands Teaching of Conservation

On a recent visit to New Haven, it was learned that Yale University is planning to expand conservation teaching in the 1952-'53 college year by inaugurating an undergraduate course in natural and human resources under Professor Paul Sears, now occupying the Chair of Conservation at the Yale Graduate School. The new course would be aimed to attract Arts students as well as those majoring in the Sciences.

Prospects now seem good for an increase in attendance in the original Graduate School course under Dr. Sears. The first class in this course will be graduated at the end of the current academic year.

Pittsburgh Law School Research Completed

The research project sponsored at the University of Pittsburgh School of Law has been completed, and the preliminary report of this study of conservation laws and their administration in the Commonwealth of Pennsylvania has been received by the Conservation Foundation.

The material lends itself to a wide variety of editorial treatment but a considerable amount of work will be necessary in order to put it in proper form for publication. It is hoped that it may eventually help in the drafting of a model conservation law of value in planning similar legislation in other states.

Mexican Visitor Praises Spanish Version Films

Dr. Enrique Beltran, noted Mexican ecologist and a leader in conservation thought in his country, called at the Conservation Foundation office the other day, and in the course of his visit saw and heard the Spanish version of "Yours Is the Land," recently completed. He expressed himself as of the opinion that this picture will be of great value to conservation in Mexico, and complimented us on the quality of the sound track which he states will be particularly well received in his country.

Plans are now being made to hold debut-previews of both the Spanish and Portuguese versions of all the Foundation films at South and Central American Embassies in Washington as well as for other important Latin Americans in the United States.

BEHIND THE SCENES

NEWS AND NOTES OF THE ZOOLOGICAL PARK, THE AQUARIUM AND THE DEPARTMENT OF TROPICAL RESEARCH

That Albino Deer Fawn

By LEE S. CRANDALL

SINCE THE ARRIVAL of our albino White-tailed Deer on December 1 (as reported in the last ANIMAL KINGDOM), procedure to be used in putting him on exhibition has aroused the imagination and interest of the entire Zoo staff.

An early experiment in liberating this lovely animal in a small enclosure came close to a tragic ending, and while we later made a half-hearted effort to mark the enclosure's fence with strips of weather-resistant paper, so the animal would see and avoid the barrier, belated caution ruled against going through with the project. It seemed pointless to risk the animal's neck by turning it out in a small temporary enclosure, since its permanent home was to be the large White-tail range in another part of the Zoo.

In moving any hoofed animals, particularly antelopes and deer, there are precautions that must be taken. Wild-bred or moat-bred animals are especially subject to accident, since they have had no experience with fences and are likely to run into such barriers with complete abandon and possibly with fatal results.

Because of the normal hostility of any established deer community to a stranger, it was obviously prudent to wait until the last buck had dropped his antlers before trying to introduce the white fawn into the range herd. We expected the antlers to drop early in March, and in the meantime our albino was left undisturbed in a shelter house on the west side of the Zoo.

Casual mention of these plans and of the normal precautions to be taken caught the imagination of our associates. What started out as routine procedure became magnified in importance and was discussed with such intensity at staff luncheons that we were often hard pressed to defend ordinary practices. Learned discussions of deer psychology and techniques of "integration with the group" were aimed at the Mammal Department, and even though they were more than half in fun, the result was inevitably a certain heightening of doubt about what was going to happen.

Finally, on March 5, the last antler was shed in the White-tail herd and we could no longer put off the day we had come actually to regard with misgiving. If the fawn should run in reckless panic and come to grief, then we should feel we had not taken proper precautions. If he ran into the midst of the herd, the presence of other deer would halt his rush. On the other hand, the oncoming white object might cause the herd to flee in terror, and then we would indeed be in trouble.

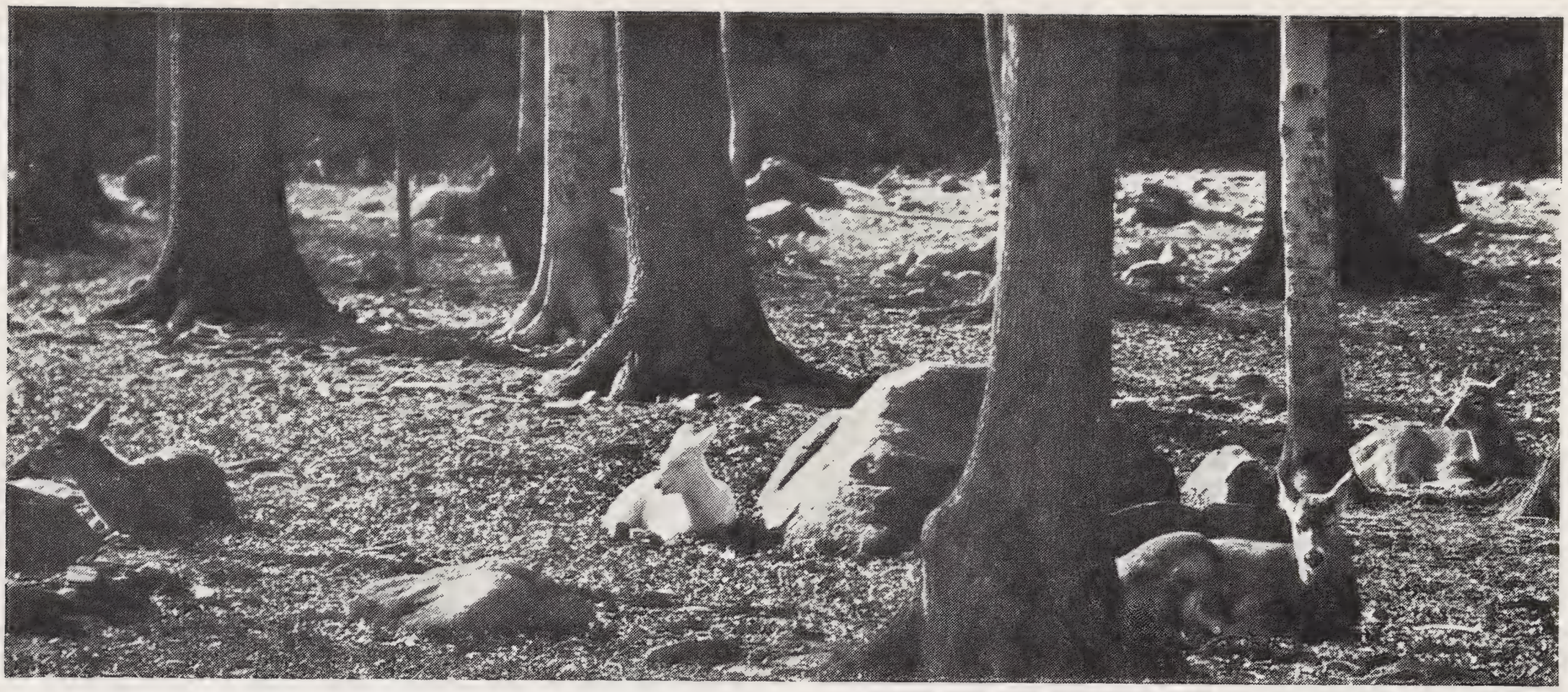
If nothing happened at all, then our planning would have been unnecessary. Everything to lose, nothing to gain. It came out like that.

We did take one last precaution. Encased in a large wooden crate with a slatted door, the fawn was carried to the White-tail range and the box was placed near the spot where the herd was accustomed to being fed. The crate was installed on the very day the last antler dropped, and this gave the fawn time to view his surroundings, to be seen and smelled by such of his future companions as dared come up for inspection, and to recover from the upset of moving. Then, on the morning of March 7, with a light fall of new snow on the ground, the door of the crate was quietly opened.

This was the moment.

With a wild rush the white fawn came out of the crate – an unbelievably lovely sight against the snow. His fate was his own making now, for there was nothing more we could do to protect him.

That first mad dash carried him twenty feet



"Integrated with the group"—the albino in the White-tail herd.

and then he stopped, bent down and snuffled in the snow. That did it; we knew the worst was over, and began breathing again.

The White-tail herd, lying quietly a couple of hundred feet away, rose to its feet as the white fawn emerged, and came slowly forward for a closer inspection. The fawn advanced to meet them, obviously expecting to be received as a fellow deer. But the reaction of the residents was on a different basis. This creature smelled and acted like a deer but certainly did not look like one. They gathered around, nostrils distended, and jumped nervously each time the stranger flicked an ear. When he walked, they followed. When they stopped, he returned to them.

By the next day they seemed to have become convinced that the white fawn really was a deer, to be treated with the contumely deserved by an interloper. When he came near enough they bit him in the ineffectual manner of deer and struck him with their front hooves. This abuse he took calmly, as proper procedure.

For the next few days the white fawn remained on probation, tolerated but not fully accepted. By the end of the week he was a recognized member of the herd, in good standing – a result very pleasant to us and presumably to him.

In thinking back over this somewhat trying episode, some points of special interest come up. This fawn was reared in nature, by his own mother, and had had a considerable experience of being a deer-among-deer. Consequently, once he found himself in the company of the herd, he accepted their actions without becoming unduly disturbed.

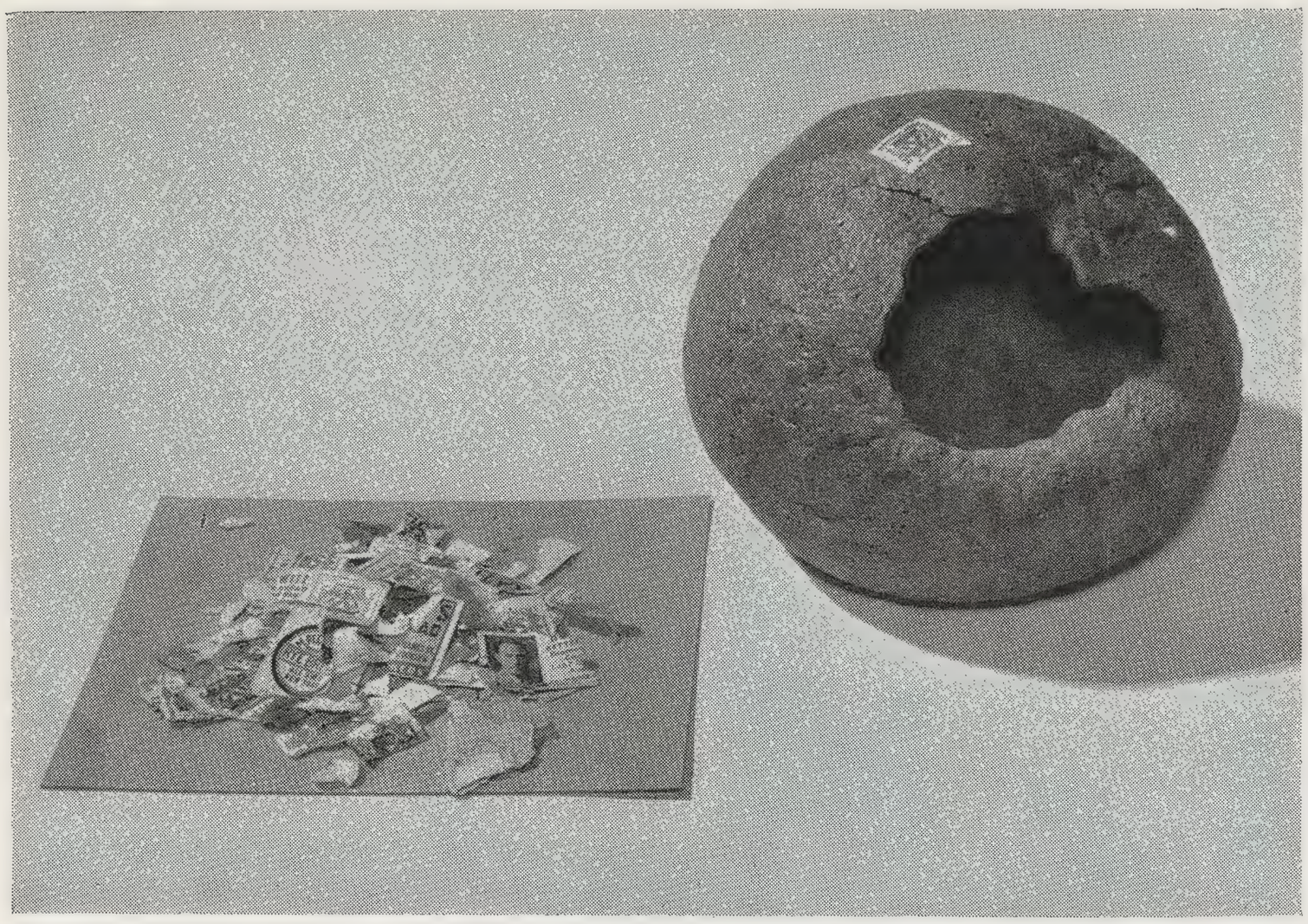
Quite different has been the experience of a gentle doe named "Laurel." She was picked up in the Berkshires when very young and was bottle-reared. Her only companions, as she grew up, were her owners and the house dogs. When Laurel came to us in her first autumn, her hazing by the herd was short-lived, for she made no effort to be accepted by the other deer. She has now lived in the White-tail enclosure for six years and is still indifferent to her companions. Usually she is seen alone, or with her latest fawn. For when autumn comes around, Laurel does for a brief time act like a deer among deer.

A Note on the First Exhibition of the Duck-billed Platypus

By LEE S. CRANDALL

WHEN THE LATE Ellis Joseph brought us a Duck-billed Platypus in 1922, this animal was accepted as the first of its species to be seen alive outside Australia, and until recently we had never had reason for questioning the authenticity of the record.

But in January we received a postcard from Alexander Lindsay, the "Answer Man" of the Chicago Zoological Park, that gave us a severe



It was a shame to disturb the domestic arrangements of the mouse that built a nest in this hard-as-rock loaf of rye bread—a nest in an edible house! Labels from other loaves supplied nesting material. The loaf was found at the bottom of Elephant House food bins.

shock. It called attention to statements in a book, "The Zoological Gardens of Europe," by C. V. A. Peel, published in 1903, concerning platypuses in Germany. The book was available in our library and careful examination revealed that "1 duck-billed platypus" is listed as living in the Zoological Garden of Leipzig in 1899 (p. 120) and again in 1901 (p. 122).

On page 152 there is a further reference to a "duck-billed platypus" in the gardens at Frankfort-on-Main, presumably at about the same period. How these statements could have escaped our attention for so long is difficult to explain, but at any rate we lost no time in checking them.

A letter addressed to our friend Dr. B. Grzimek, Director of the Zoological Garden at Frankfort-on-Main, brought the following reply dated February 1, 1952:

Dear Mr. Crandall:

The Frankfurt Zoological Gardens were totally burned and bombed by air attacks during the last war. There has been left no book and not one piece of paper, therefore it is difficult for me to answer your question in correct way out of the books. But our Oberinspektor G. Lederer, who is working here since 1913, says that there was a stuffed specimen of Platypus at that time in the Gardens, which was brought from Australia by a man called Görling. He thinks that it arrived dead. We have looked in the old editions of the journal "Der Zoologische Garten" from those years and there isn't mentioned any Platypus for Leipzig and Frankfurt. I think that the Platypus which is mentioned by Peel is the stuffed piece in Frankfurt but naturally I am not sure about it. At the same time I am writing to Prof. Dr. Schneider in Leipzig (Director of the Zoological Garden there). Perhaps he knows more about it, because he is much older than I."

On February 18 Dr. Grzimek wrote again, saying that he had received word from Dr. Schneider "that they never did have a living platypus in Leipzig."

Since the Frankfort's Zoo's official records were destroyed, the only way of checking the statements in Peel's book would seem to be the recollection of old employees and the indirect but nevertheless potent testimony of "Der Zoologische Garten." That journal allowed little of moment in the zoological world to escape notice in its columns, and the arrival of a live Duck-billed Platypus in Germany would have been major news. That "Der Zoologische Garten" did not mention it is reasonably conclusive evidence that it did not happen.

With Dr. Schneider as authority for the statement that Leipzig never had a living Duck-billed Platypus, and the available evidence pointing to Frankfort having had only a stuffed one, it appears that Peel's book is in error and that the first living Duck-billed Platypus outside of Australia was indeed the one exhibited for 47 days in the New York Zoological Park in 1922.

PUBLICATIONS OF INTEREST

WILD ANIMALS IN CAPTIVITY. By Dr. H. Hediger. Foreword by Dr. Edward Hindle. 33 illus, from photographs, numerous drawings. Butterworth's Scientific Publications, London, 1950. Distributed in U. S. A. by Academic Press, New York. $6.00.

For the presentation of this important pioneer work dealing largely with the psychological aspects of captive

wild animals, Prof. Hediger is uniquely prepared. His activities as Director of the Zoological Garden of Basle, at the University of Basle and in the field, have provided a well integrated experience in the theory and practice of animal behavior in its various aspects.

First printed under the title "Wildtiere in Gefangenschaft" by Benno Schwabe & Co., Basle, 1942, it was not until the appearance of the present translation by G. Sircom that the work gained wide circulation in English-speaking countries.

A charmingly modest man, Professor Hediger says, in his introduction,

"Curators of zoos and private collectors may perhaps find in this short work some stimulus; they will certainly find many gaps. It is because of these that definite results may be expected from this work. It should persuade all who are interested in wild animal management to look for the frequent omissions and fill them in as quickly as possible. Only by the cooperation of all who are interested can this rough, imperfect outline be improved and completed, and a practical plan emerge, of use in the management of zoos throughout the world, as well as for biological research, and for the welfare of the animals themselves."

This disarming statement forestalls petty criticism and encourages acceptance of the book for what it is: a bridging of the gap between the operator of the Zoological Garden and the animal behaviorist, to the great profit of both.

The work is divided into three main sections: Space, Food and Animal-Man Relationship. Naturally, the first category is the most extensive and includes ten chapters devoted to territory, sociological factors, the problem of confined space and environment. A single chapter on food is broken up into seven sub-heads covering various aspects, including feeding patterns, presentation, excretion and breeding. The final section treats in general the status of the Zoological Garden in man-animal relationships. It is here that the only really controversial point comes up, for Professor Hediger feels that training of wild animals should be encouraged, a stand with which many will disagree.

While the book is not intended as a manual of zoo practice, it nevertheless is of great value in that field, for it establishes the facts that most animals live longer in captivity under proper conditions and that conditions which fulfill the basic requirements, even in restricted spaces, are readily established. Also, many special needs and reactions, often noted but not always understood, are explained. The behaviorist is urged to apply himself more diligently to work on the animals so easily available in the larger zoological gardens and so help them to reach the highest justification for their existence.

— L. S. C

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ANIMAL KINGDOM

Bulletin of the New York Zoological Society

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Attitudes Toward Animals

SOME DAY a book should be written on the varying attitudes of peoples of different countries toward animals, tracing the cultural influences that are responsible for them.

If one starts with the premise that, on the average, human beings the world over have similar innate qualities, that goodness and kindness on the one hand and badness and cruelty on the other, are largely the consequences of cultural environment, it is remarkable to note the wide variations that exist in the relationship between man and other living things.

Many examples could be given that suggest some of the illogical and contrasting patterns of human behavior toward our fellow creatures. Religion sometimes plays a curious part. In the Moslem world it is wrong to take the life of an animal. This benevolent concept leads to consequences that, in our eyes, entail needless suffering and cruelty, as when domestic animals, too old for usefulness, are allowed to starve to death. The painful experience of finding song-birds in a bird-shop in Naples deliberately blinded in the illusion they "sing better" if sightless is not easily forgotten. Yet such cruelty is a cultural result, not innately a racial characteristic – a number of the most gentle and competent of our animal-keepers in our own Zoological Park are of Italian ancestry. An anomaly is presented by the British, as well as by Americans, in that hunting, shooting and "blood-sports" are an accepted part of recreation, yet there is wide-spread popular support of humane organizations for the care and prevention of cruelty to animals and of anti-vivisection leagues.

One will ask, of course, "What of man's inhumanity to man?" Perhaps kindness to other living things, including peace among men, is all of a piece. As we learn to treat each other better, we may in turn improve in our treatment and protection of animals. They, at least, have no redress and no defense if we do not.

Fairfield Osborn

The Prevention and Treatment of Snakebite

By JAMES A. OLIVER

With the arrival of another summer vacation season, fishing gear and camping equipment are being dusted off and readied for use. Plans are being made for an exciting canoe trip through the northern woods, for a summer at one of the dude ranches in the far west, for a weekend hike along one of the timbered trails in the Smokies, or for a one-day visit to Bear Mountain Park. Millions of Americans are poised for their annual excursions into the Great Outdoors. This is the traditional season for communing with nature – for renewing outdoors our mental and physical vigor that has been nearly expended by sedentary, indoor living of the past winter. The overall benefit of outdoor activities is beyond measure and repays the cost many times over.

To obtain the full benefit from vacation excursions we must avoid the hazards that may be encountered. Most of these hazards consist of minor annoyances, such as sunburn, ivy-poisoning, insect bites and stings, but others are more serious and may actually result in loss of life. One of this latter group is the hazard of venomous snakebite, unfortunately often exaggerated in importance. In the minds of many people, all snakes are deadly and the out-of-doors abounds with snakes lurking to pounce on the unwary.

This belief is a fantasy, an exaggeration lying far from the truth. In the first place, venomous snakes are definitely in the minority. Of the approximately 250 different snakes known in the United States, only fifteen percent. are venomous, and only a few of these can be considered deadly. Secondly, there are few localities in this country where snakes are at all common. In fact, most people rarely see a snake in the wild, but because of their fear of snakes, the number seen and reported is unconciously increased. Thirdly, virtually all snakes will keep out of man's way if given a chance.

These basic considerations attest that the popular concept of the importance of snakebite as an outdoor hazard is greatly exaggerated. Its relative unimportance also is reflected by the difficulty of obtaining reliable statistics. Figures are published from time to time, but it is virtually impossible to evaluate their accuracy. Some people undoubtedly are bitten by snakes and do not report it because they live in remote regions, while false reports are contributed by excitable persons who are stung by insects, encounter stinging nettle or merely get scratched in the woods. The Antivenin Institute of America endeavored to compile a record of the number of persons bitten in the United States for the years 1928 and 1929, and the results have been summarized and analyzed by Dr. R. H. Hutchison. He obtained reports of five hundred to six hundred bites per year, which he estimated to represent about a third of the total actually occurring. Thus, on the basis of his calculations, between 1,500 and 1,800 persons were bitten by venomous snakes in the United States in each of the years 1928 and 1929. The mortality rate was slightly more than five percent., indicating an annual mortality due to venomous snakebite of not more

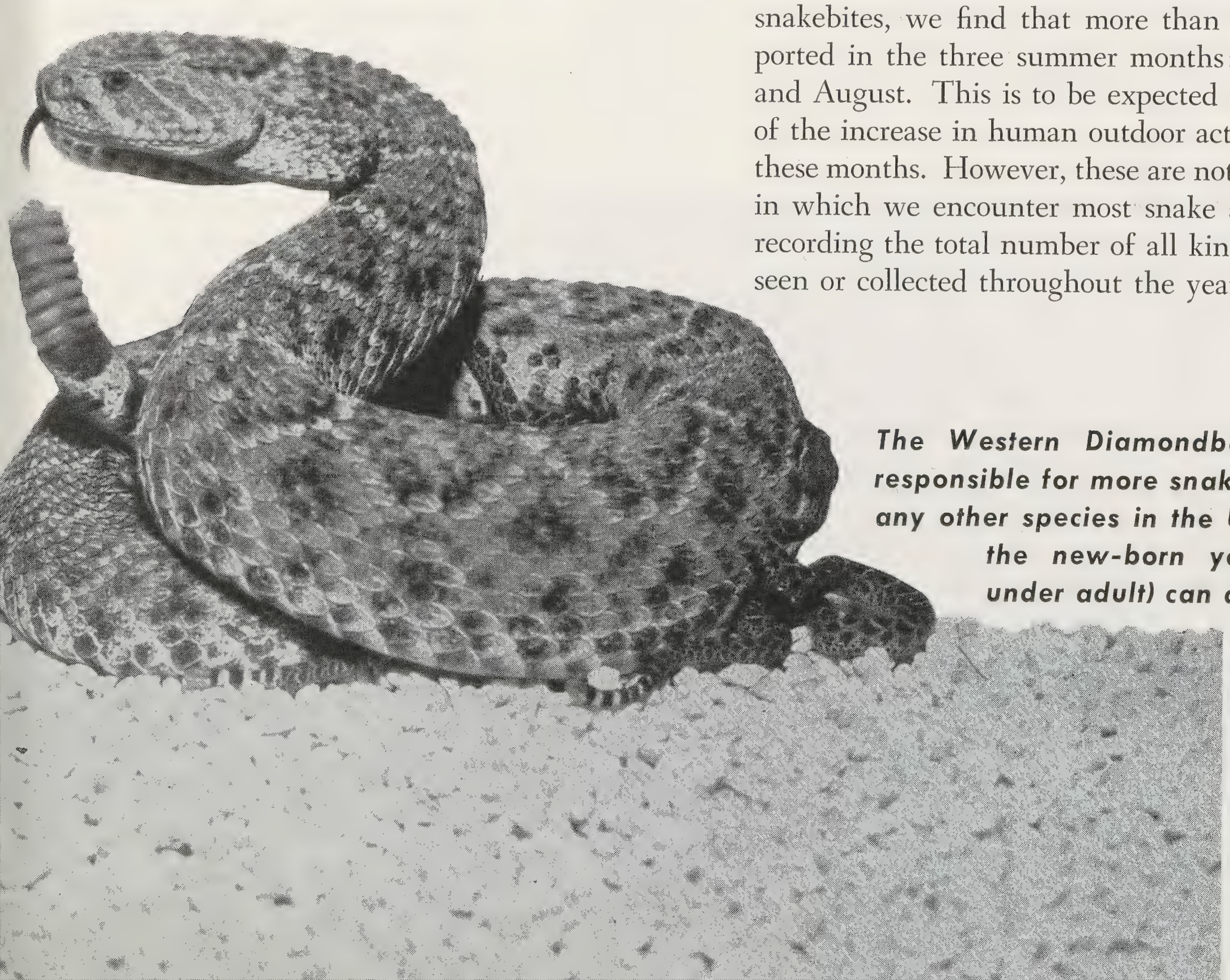
than one hundred persons. These are conservative figures and are probably considerably in excess of the actual number of bites. By way of comparison with one of the more prosaic causes of death, figures indicate that more people are killed by lightning than by venomous snakes. Mr. Graham Netting, the herpetologist of the Carnegie Museum in Pittsburgh, has pointed out that in the United States far more people are injured and killed by accidents in the bathtub than are involved in bites by venomous snakes. He concludes that "many more persons suffer from snake fright than from snakebite".

Since no figures later than 1929 are available for the entire United States, it is impossible to determine whether the number of bites is increasing or decreasing. Mr. E. Ross Allen has compiled figures on the number of snakebites in Florida alone from 1934 to the end of 1951, but they do not clearly indicate the trend. The number of bites reported for 1948 is well above the average number for the total period 1934 to 1948, but is very similar to the number reported in 1935. A slight increase might be expected from an increase in communication and transportation facilities, but on the other hand, a decrease would be indicated by fuller land utilization and human activities that would indirectly reduce the number of venomous snakes in the state.

It is interesting to note that the percentage of mortality resulting from snakebite in Florida appears to be three times more than that reported for the United States as a whole, averaging approximately fifteen percent. over a fourteen-year period. This higher figure results from the fact that often more than half of the bites reported annually in the state are by the large and deadly Eastern Diamondback Rattlesnake (*Crotalus adamanteus*). Of the seventy-six deaths reported from snakebite in Florida over the fourteen-year period, seventy-one were the result of bites by this snake.

Throughout the United States, the Copperhead (*Agkistrodon contortrix* subspecies) is responsible for the greatest number of bites reported, with more than a fourth of all bites being by this snake. However, there is *no* record of a fatality attributable to this species. The snake responsible for the greatest number of deaths in the United States is the Western Diamondback Rattlesnake (*Crotalus atrox*) of the southwestern United States and Mexico. For those living in the northeastern states, it is comforting to know that less than a fourth of the snakebite fatalities reported in 1928 and 1929 occurred east of the Mississippi River and north of the Mason-Dixon Line.

If we examine the seasonal occurrence of snakebites, we find that more than half are reported in the three summer months: June, July and August. This is to be expected on the basis of the increase in human outdoor activity during these months. However, these are not the months in which we encounter most snake activity. By recording the total number of all kinds of snakes seen or collected throughout the year in a given



The Western Diamondback Rattlesnake is responsible for more snakebite fatalities than any other species in the United States. Even the new-born young (at left, and under adult) can deliver a lethal bite.

A pit viper's skull, showing the large, hollow fangs with their replacements just behind. The short teeth on the upper and lower jaws are not part of the venom apparatus.

locality in the northeastern United States, we find that more than forty percent. are reported during one month, either April or May. Following this peak of spring activity the total drops off markedly, reaching a minimum in late August or early September. There is a slight increase again in the numbers seen in late September and early October, followed by a sharp decrease as the snakes go into winter hibernation.

Thus the seasonal incidence of all snakes seen is very different from the seasonal occurrence of snakebites. Why? Is the seasonal occurrence of bites due solely to the fact that more people are out in the summer months? If this is the only factor, then why aren't more snakes seen and collected at that time also? It should be noted that in talking about the total number of snakes seen or collected we are combining records for all species together. But are all snakes active at the same time? If we compare the same records mentioned above for all snakes throughout the year with the figures for the Copperhead alone, we find that a maximum number of Copperheads will be seen or collected in the months of June, July and August, with a secondary peak in October. The seasonal incidence of the Copperhead follows a pattern very similar to that for the seasonal distribution of snakebites in the United States. The fact that the Copperhead is responsible for such a large number of bites may be part of the explanation of this similarity. However, the increase in human activity outdoors at the same time is also a contributing factor.

Throughout the world there are many different kinds of snakes that possess a toxic venom. These differ in a number of important features, including details of their venom and venom-injecting structures. It is well to point out here that contrary to popular belief, the tongue of snakes is soft and harmless, playing no part in biting. In some venomous snakes the rearmost teeth in the upper jaw may be enlarged and grooved on the side, with the venom flowing down this groove when the snake bites. This type of development represents a rather crude method and usually requires the snake to chew on the victim to insure injection of the venom. Few of these rear-fanged snakes are dangerous to man and none occurring in the United States is so considered.

The other main type of development of venom-injecting apparatus is possessed by snakes with an enlarged, hollow fang on each side in the front of the upper jaw. When one of these snakes bites, the venom is injected through the hollow, hypodermic-like fangs. This is a much more efficient device for the injection of venom. The front-fanged venomous snakes can be divided into two groups on the basis of whether the fangs are virtually immovable in the upper jaw or whether they are freely movable. In snakes with nearly immovable fangs, these teeth are usually short and the mouth can be closed with the fangs in the erect position. To this group belong such

well-known venomous snakes as the Cobras, the Mambas and the Coral Snakes. The latter are the only representatives found in the United States.

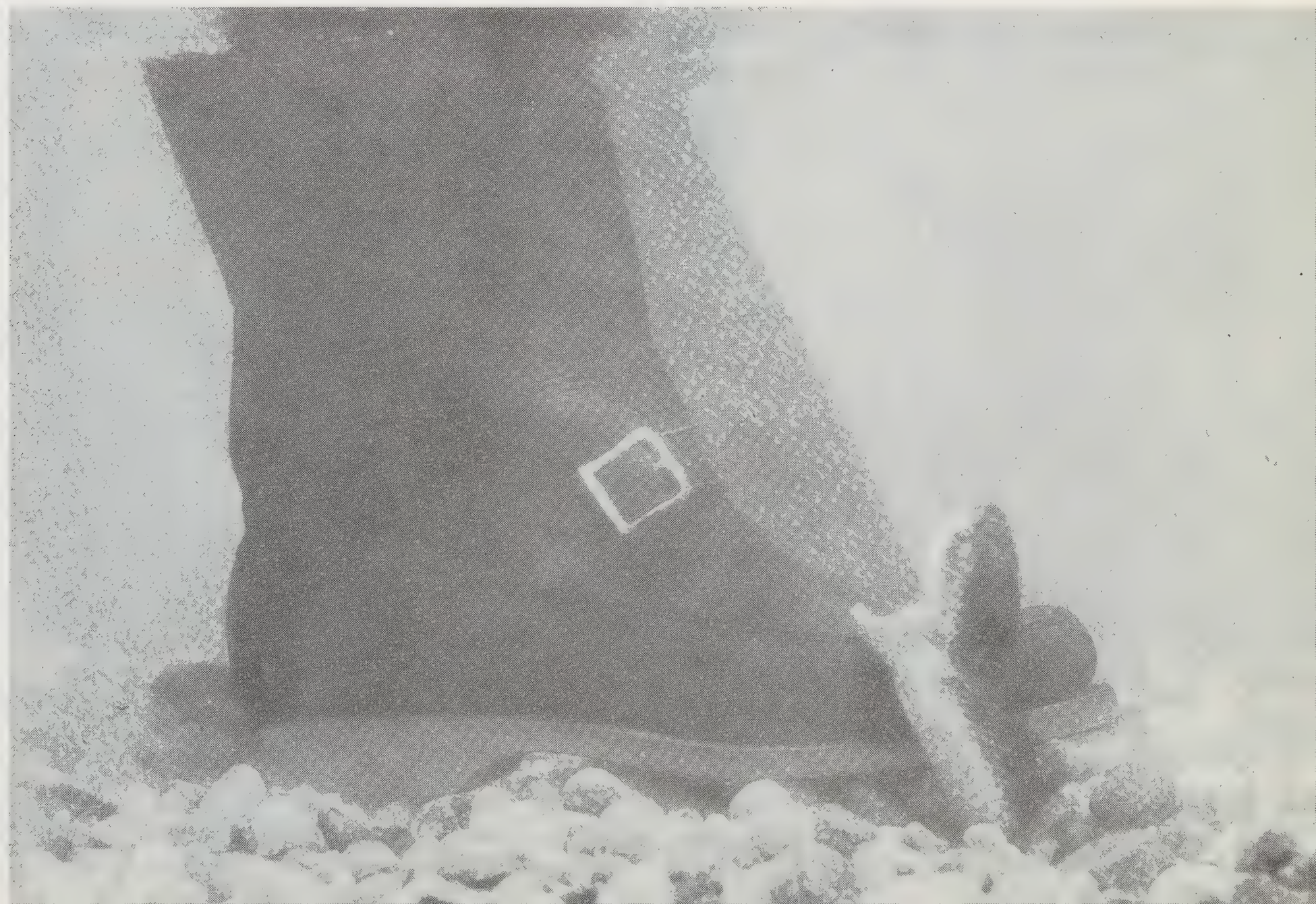
Snakes with movable front fangs include the True Vipers of the Old World and the Pit Vipers of both the Old and New Worlds. All of our venomous snakes in the United States, with the exception of the Coral Snakes, belong in this group. When not in use, the fangs are folded against the roof of the mouth, but they can be quickly erected for striking. Usually they are longer than the immovable fangs.

The fangs are shed periodically, but the new one moves into place beside the old one before the latter is shed. Thus a snake may have two fangs in place on one side for a short time. Immediately behind the functional fangs on each side there is a graded series of replacements. If the functional fangs are accidentally broken off or pulled out, it is a matter of only a few days until a replacement moves into place.

There is a venom gland on each side of the head just back of the eye, and each is connected to a fang by the venom duct. Contraction of the muscles surrounding the glands forces the venom out of the gland, through the venom duct and out through the fang. Some of the Cobras of Africa and Asia have further modified this venom apparatus and can eject or "spit" the venom. None of the snakes in the United States have this ability, although when an infuriated snake strikes short of its target, some venom may be thrown out for a short distance. Even though it hits bare skin, such venom will do no harm unless it enters a scratch, a sore or the eyes.

All our venomous snakes, except the Coral Snake, characteristically strike from a coiled position with the anterior part of the body immediately behind the head forming one or more S-shaped loops. This position enables the snake to lunge out at an adversary before it comes in contact with the snake's body. Usually the snake does not strike more than a third to a half its total length and does not leave the ground when it strikes. Some of the rattlesnakes when thoroughly aroused may strike so vigorously as to cover a distance approximating their own length and the body may actually leave the ground an inch or two. A strike of this force is unusual.

A question frequently asked is whether or not a snake can strike without coiling. The catch in this question is the word "strike." I think most inquirers intend to ask whether or not a snake can *bite* without coiling. The answer is that a snake can bite at any time, from any position, but that unless the snake is in at least a partial coil, it cannot move the head very far to hit an object. Another matter about which there is a good deal of misunderstanding is a snake's ability to bite under water. This is a double query: can it bite under water; and, if it can, will the venom be diluted by the water? The answer is that a snake can and will bite as effectively under water as on land, but the distance that it can



The Cottonmouth Moccasin can bite under water just as effectively as on dry land. Snakeproof boots will give protection in the water.

strike is reduced by the resistance of the water. Because of the hypodermic-like apparatus by which the venom is injected, the effects of the venom will be as severe as in a bite on land.

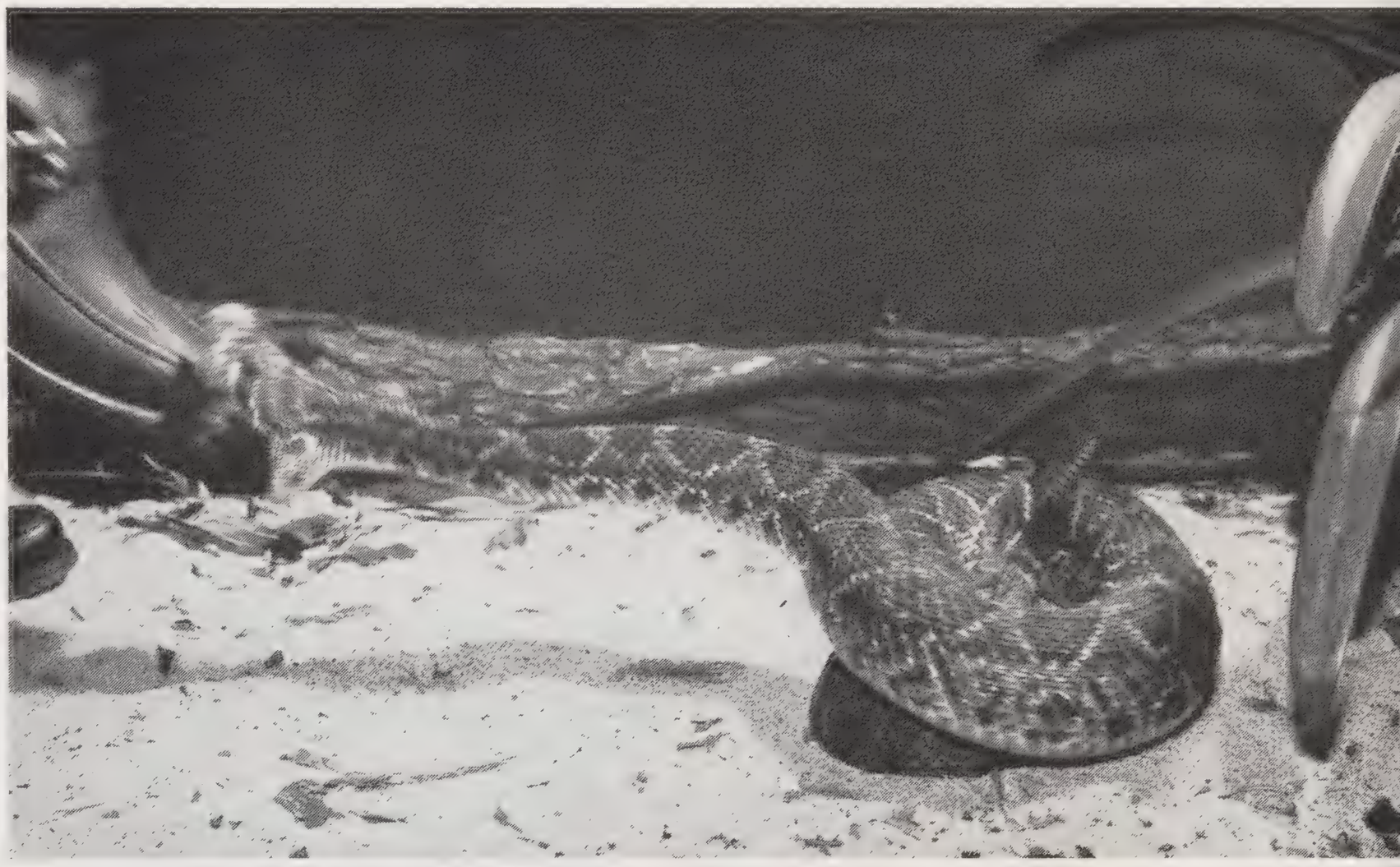
Coral Snakes differ from other venomous snakes of the United States in that their defensive position is often with the body loosely arranged in two or three irregular loops, and the head lowered at the end of one of the loops. In striking the head loop is lashed from side to side in quick, jerky movements. Thus the snake appears to slash sidewise rather than to stab out from the body position.

Striking and biting are so quick that there is disagreement as to whether snakes like the rattlers actually bite or whether they stab when they strike. Photographs taken with stroboscopic light leave little doubt that the initial movement involves an outward stabbing motion. But when the snake hits the object at which it is striking does it merely stab with the erected fangs and withdraw them, or does it quickly bite and withdraw? Does it stab under one set of circumstances and bite under another?

There is no conclusive answer to these questions at the present time. In the photographs of a rattlesnake striking that accompany this article, it certainly appears to be biting rather than stabbing. Most of the evidence indicates that in the rattlesnakes, at least, the typical strike involves a bite rather than a stab. This question is of importance in relation to the use of the teethmarks in diagnosing a venomous snakebite, as mentioned below.

What preventive measures can we take to reduce the risk of being bitten by a venomous snake? In order to answer this question it is instructive to analyze the bites reported by Hutchison. In more than a thousand bites, he found that fifty-seven percent. were inflicted on the legs. Of the bites on the legs, forty percent. were on the foot, twenty-nine percent. were on the ankle, twenty-nine percent. on the shin, and the remaining two percent. on the thigh. Forty-two percent. of all the recorded bites occurred on the arms, with fifty percent. of these being on the fingers, thirty-one percent. occurring on the hand, eight percent. on the wrist, ten percent. on the forearm and the remaining one percent. on the upper arm. Out of all the bites recorded, less than one percent. occurred on the head and trunk. Equally instructive are the circumstances under which the bites occurred. Where this information was recorded, sixty-three percent. of the bites resulted from stepping on or too near a venomous snake, twenty-seven percent. occurred while picking up objects, six percent. while catching or handling snakes, three percent. while reaching into or under something, and one percent. while sleeping outdoors.

From this analysis we get a number of indications as to what preventive measures will be most effective. As far as proper preventive measures for the individual are concerned, they include protective clothing and common sense habits.



This Eastern Diamondback Rattlesnake is striking for a distance of about one-third its length—the usual range of such attacks.

Here the snake has actually c nected with the boot, and a d of venom can be seen just be the white sheath of the fa

Varying degrees of protection are afforded by clothing. LEFT: A rolled pants leg may be comfortable, but it leaves the leg open to attack. Better keep the cloth rolled down. CENTER: Snakebite-proof boots are real protection. RIGHT: Best of all is to wear snakebite-proof boots AND rolled-down pants leg.

Protective clothing is practical only for the lower legs, but since more than half of all bites occur in this region of the body, it is quite important.

Any covering of the legs is better than going barefooted and barelegged. However, the thicker the covering, the greater the protection. Thus leather shoes give more protection than canvas "sneakers." Long trouser legs give more protection than bare legs because the snake's fangs may be caught in the cloth or the cloth may deflect the strike. In areas where venomous snakes may occur the trouser legs should not be rolled up to the knees, as is done by many young people.

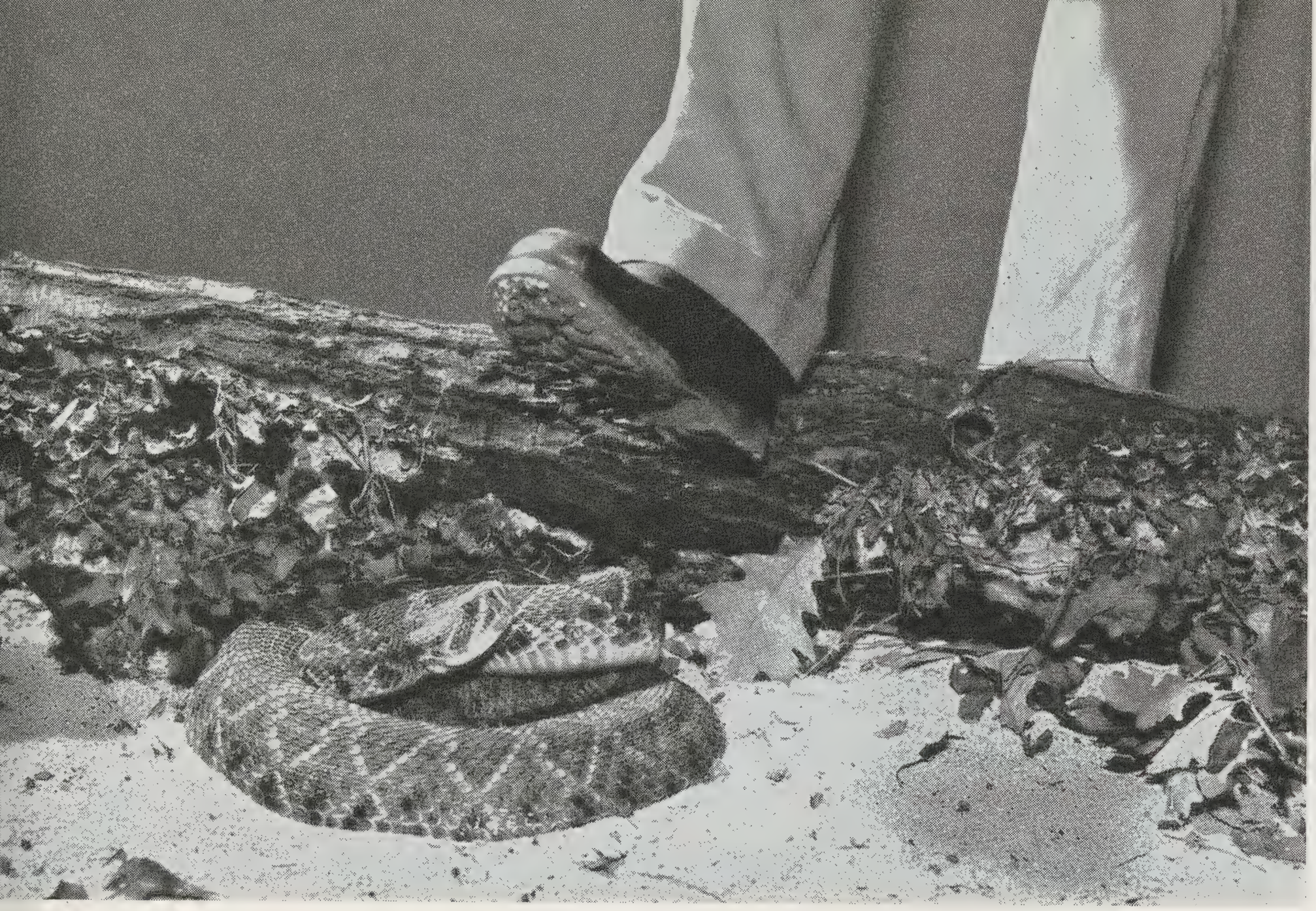
High leather boots or heavy leather shoes with leather puttees give good protection against the bites of all but the largest venomous snakes. An additional measure of protection is obtained by wearing the trouser legs outside of the boots or puttees instead of tucking them in. The only complete protection for the lower leg against the bites of all of our venomous snakes is obtained by wearing thick, snakeproof boots. Such boots have long been manufactured by the Gokey Company of St. Paul, Minnesota. These boots have been tested successfully many times against the bites of our largest venomous snakes. Although made of extra heavy bull hide, this boot is soft and comfortable to wear. Through the courtesy of the Gokey Company their snakeproof boots were used in making the photographs of snakes striking for this article.

Of the bites occurring on the legs, ninety-eight percent. were inflicted below the knee. The wearing of snakeproof boots would prevent these bites. The possibility of a bite being inflicted on the thigh is too remote to justify the wearing of awkward and bulky protective covering on the thighs. Such rare occurrences can largely be avoided by developing protective habits.

The simple principle in all the protective habits is to avoid putting any part of one's body within the striking range of a venomous snake. If this basic rule is kept in mind at all times when outdoors, the risk of being bitten can be greatly reduced. It is impossible to cover every situation that may be encountered in the woods, but the commonest mistakes that lead to snakebite accidents are discussed briefly in the legends of the "Do-Don't" photographs in this article. If these warnings are taken to heart, they should materially reduce not only snakebite accidents but many other kinds of outdoors mishaps as well.

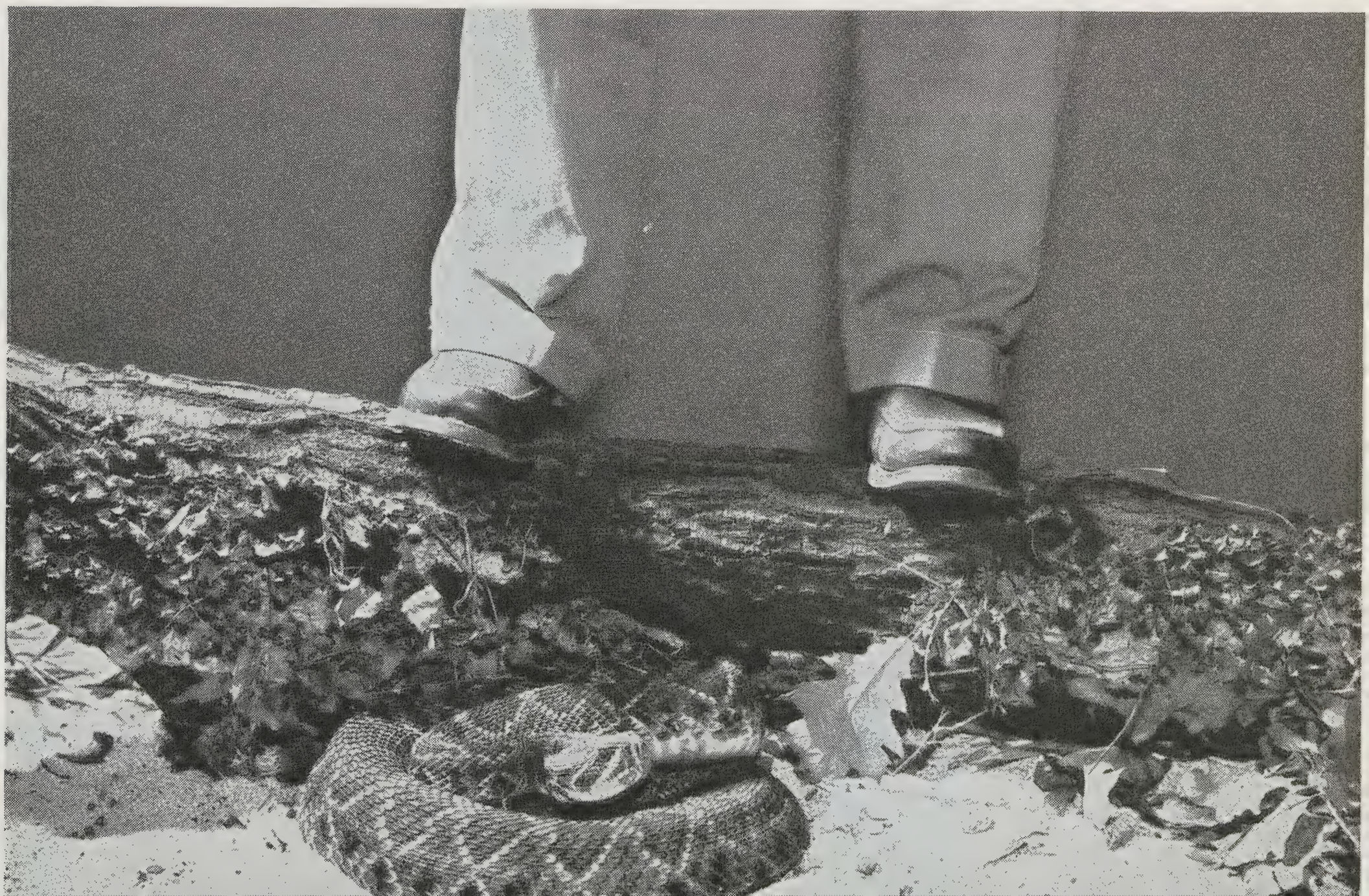
DON'T sit down without taking a careful look at the object you're going to sit on. There are several cases on record of persons actually sitting down on venomous snakes.

DO make sure that even if there is no snake directly on the spot where you are going to sit, there is nothing lurking under the object or hidden alongside or under the surrounding debris.



DON'T blithely step over a log or rock or other such obstruction in the woods without making sure what's behind. You might step on or alongside a venomous snake.

DO step up on the log first. It takes only a fraction of a second to glance down as you step up, and then you can be sure it's safe. You should try to make caution a habit when in the woods.



DON'T turn up boards and chunks of wood AWAY from you, as in this picture. If a snake happens to be underneath, it can strike at your feet while you are still lifting.

DO stand behind the object you are going to pick up, and pull it TOWARD you. By that simple precaution, you have put some sort of a barrier between your legs and whatever is beneath.

DON'T put your fingers in or around the mouth of a freshly-killed snake. Reptiles have prolonged reflex actions. People have actually been bitten by quite-dead snakes.

DO use a stick (and a long one, too) for probing around the head of a dead snake. A stick is just as convenient, if you are looking for fangs or facial pit — and a lot more sanitary!

DON'T put your hand (especially while climbing) on a rock ledge or rock wall unless you can see all around the spot and can be sure there isn't a snake just out of sight.

DO look before you reach. Rock ledges are a favorite denning place for Rattlesnakes and Copperheads and in the early spring or fall you are likely to find them sunning in the crevices.

DON'T pick up chunks of firewood or boards by putting your fingers under them. A rubber "hand" is used in this picture to show how close you might be to real trouble.

DO pick up objects by grasping them at the ends or sides Look first and grasp firmly later. How do you know what' underneath? Many snakes seek shelter under logs and similar debris

And, furthermore, when you're in the woods - -

DON'T

DON'T put your hands in hollow logs or down holes. They're excellent shelter for snakes and you might put your hand on one.

DON'T handle or play with venomous snakes. In 1929 alone, 26 persons were bitten while catching or handling venomous snakes.

DON'T camp where there are brush piles, rock piles, wood litter and the like. Those spots frequently shelter snakes and their prey.

DON'T gather firewood at night, because even with a good light you can't always see all around where you are putting your hands.

DON'T walk right next to a rock ledge or rock wall. Snakes may be resting in the crevices well above your protective covering.

DON'T sleep on the ground in areas where venomous snakes occur if you can possibly avoid it. As the temperature drops at night, snakes seek shelter and may be attracted by the warmth of your body. You won't like it.

DO

DO investigate such places with a long stick, if you really have to investigate. Prod gently and you can soon tell if there's anything there.

DO learn to recognize the venomous snakes of your region. If you want to handle snakes, be sure they belong to the species that are safe.

DO find a clean area for your camp, or clean up the site. You'll be more comfortable, and you won't be running a quite unnecessary risk.

DO estimate your firewood needs in advance and lay up a sufficient supply during the daylight hours. It's just ordinary common sense.

DO keep several feet away from rock walls and ledges. If that isn't possible, the least you can do is to move cautiously and look around.

DO sleep in a hammock or on a cot, if you can, for venomous snakes rarely climb off the ground. If you must sleep on the ground, choose a spot free from brush. Incidentally, a horsehair rope doesn't stop any kind of snake.

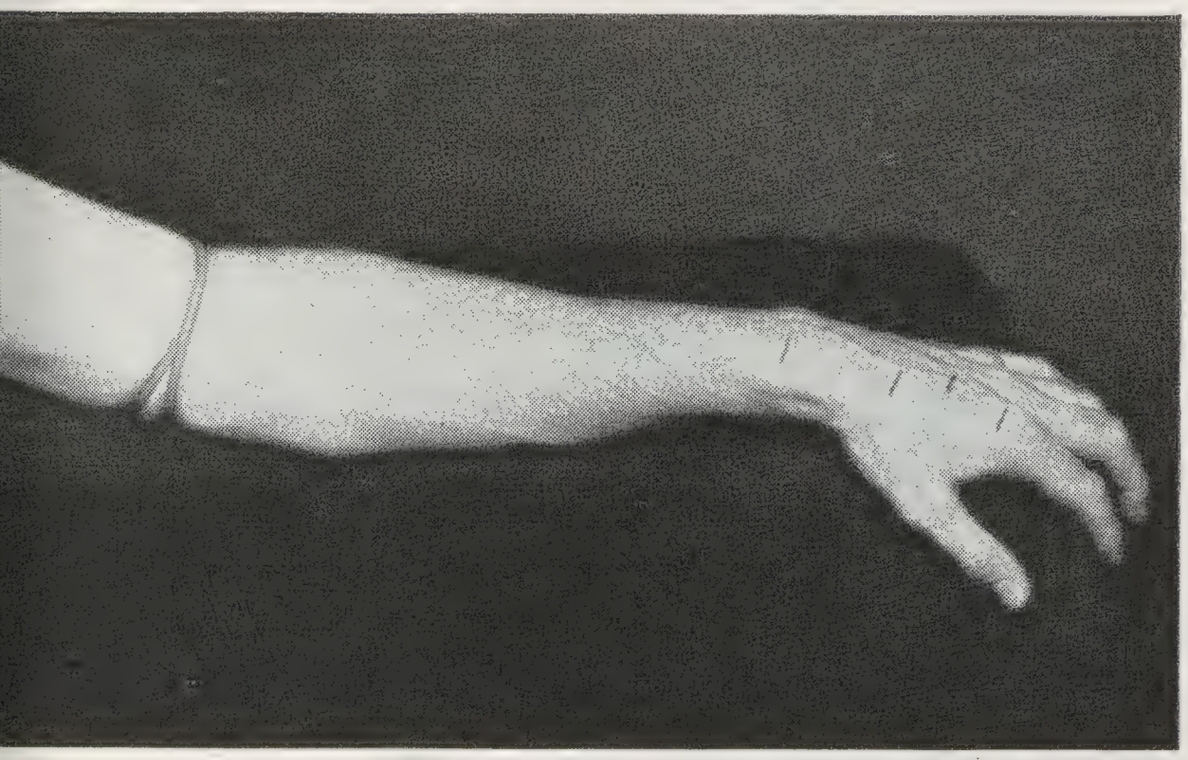
Portrait of a boy looking for trouble.

In the event that a venomous snakebite does occur, what is the proper method of treating it? Unfortunately, there is considerable disagreement on this topic. This is partly a reflection of the relative unimportance of snakebite from a medical standpoint, and is also due in part to the great number of variable conditions involved in each individual snakebite. The seriousness of a bite may be influenced by many factors — the physical condition of the individual bitten; the part of the body on which the bite is inflicted; the type of bite; the size and species of the snake (which will have some bearing on the depth of the bite and the amount of venom injected); and, finally, the physical condition of the snake. It is beyond the scope of this article to elaborate on these variables, but they will determine the outcome and results of the bite. Despite the existing disagreement about the details of treatment, it is certain that the immediate application of first aid measures is important in limiting the effects of the venom. And here a word of warning should be given: apply first aid treatment with care and forethought, or else the tourniquet, the incisions or an antivenin reaction may be as painful as the effects of the venom.

If one is bitten by a venomous snake, first aid treatment should be started *immediately,* and *calmly,* not hysterically. First apply a constricting band around the bitten limb just above the site of the bite, so that the band is between the bitten area and the body. This constricting band, the tourniquet, *must not* be applied so tightly that it stops the circulation. Its purpose is to slow, not stop, the circulation; therefore, it should only constrict the limb slightly. There is a very real danger in putting the tourniquet on too tightly and in leaving it on too long when tight. The consequences of this may actually be worse than the effects of the venom. To guard against this possibility, first aid instructions state that the tourniquet should be completely released for a minute every ten or fifteen minutes.

Next, make several short incisions in the vicinity of the bite. These incisions should be between one-half and three-quarters of an inch in length. The depth to which the cut is made will be determined by the location of the bite. A deep cut cannot be made on the fingers or toes without the risk of damaging a blood vessel, nerve or tendon. Therefore, incisions made on the finger or toes must not be too deep until swelling occurs. A deeper cut can be made parallel to the long axis of the limb, finger or toe. This will serve also to reduce the risk of cutting a vessel, nerve or tendon. The purpose of the incisions is to permit drainage and removal of the blood fluid and lymph that has become mixed with the venom in the vicinity of the bite. As swelling occurs and moves up the limb, additional incisions should be made in the newly swollen portions. This procedure will result in a number of small incisions over the swollen area of the bitten limb.

To facilitate and speed up the removal of the venom-contaminated body fluids, suction should



DON'T make incisions across the limb, as here. And this tourniquet is much too tight, so that it cuts off the supply of blood.

DO make incisions this way—the long way of the limb. Note how suction cups are applied; also that the tourniquet is not tight.

These are antivenin and suction kits, compact and easily carried in the field. Dark objects in the foreground are suction cups, shown as they appear both packed and open ready for use. A tube of antiseptic solution, a knife and a tourniquet fit inside the cups.

be applied to the incisions. If no other means of suction is available, this can be done by sucking with the mouth providing the individual does not have any open sores on the lips or in the mouth. It is far better and safer to use small rubber suction cups for this purpose. Virtually all the snakebite first aid kits now sold on the market include some type of suction device. It is advisable to purchase one of the kits that includes more than one suction piece. If the rubber suction cups are used, several of these can be applied to different incisions at the same time, thus making the drainage more effective.

The effectiveness of the incision-and-suction technique has been questioned by some herpetologists, on the grounds that the venom mixes immediately with the blood serum, lymph and body tissues and at the present time there is no effective means of separating them. Despite this fact, it has been shown experimentally that in the case of a bite by a rattlesnake enough toxic material (the mixture of venom and body fluid) can be removed by incision and suction to kill a second experimental subject. This impresses me as being sufficient proof of the effectiveness of this method in treating bites inflicted by our North American Pit Vipers.

Suction should be continued until the swelling stops spreading. This may be anywhere from five to fifteen hours, depending upon the seriousness of the bite. Suction may be interrupted briefly for rest periods during which time the limb should be covered with cloth packs saturated with strong table salt or Epsom salt solutions. If prolonged suction is required, the attending physician should give blood transfusions as needed.

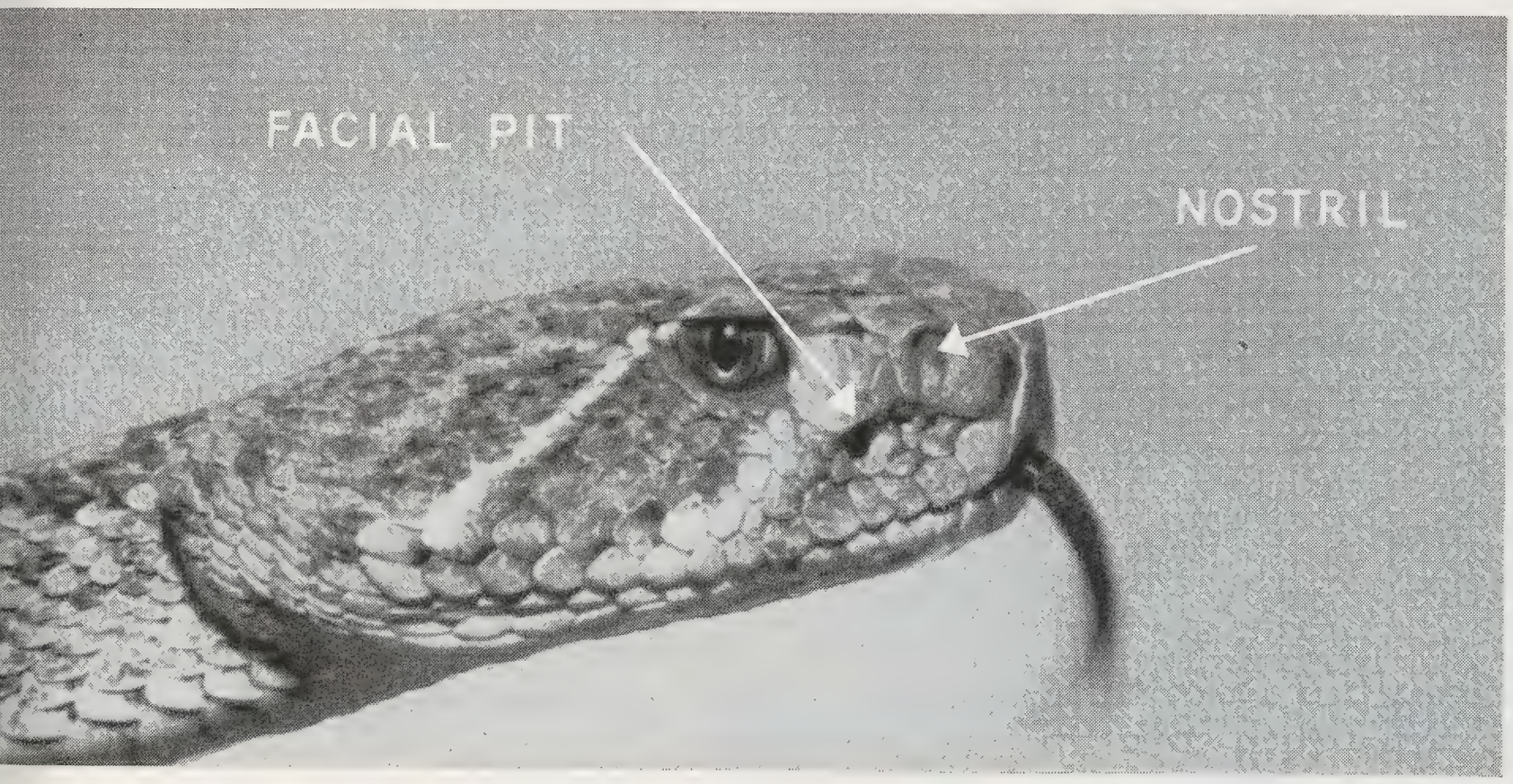
An antivenin serum for snakebite in the United States is manufactured by Wyeth, Inc., Philadelphia 3, Penn. This serum is prepared to counteract or neutralize the venoms of the North American Pit Vipers which primarily affect the blood, but not for use against the bite of the Coral Snake whose venom affects the nerves. It is manufactured from horse serum that has been immunized against the venoms of a number of different North American Pit Vipers, and must be used with care because of the sensitivity of some people to horse serum. Each package of this antivenin is provided with a small vial of normal horse serum to be used for testing the individual's sensitivity and for desensitization in case of marked sensitivity. However, unless the bite is very severe or much time will lapse before getting to a doctor, it is advisable to have the antivenin injected by a physician. When there is no history or evidence by test of marked sensitivity to horse serum, the antivenin may result in considerable relief and improvement.

Anyone going hunting or camping in remote regions where venomous snakes may be encountered would be wise to take serum with him and be prepared to administer it himself. In the case of a severe bite by a large snake, as many as five tubes of serum may be required. In most cases the antivenin is injected intramuscularly or subcutaneously, with about half of the initial dose being put in at the site of the wound and the remainder being injected higher up on the limb or on the trunk. In severe bites intravenous injection by a doctor may be required.

Because the effects of the venom vary inversely with the bulk of the body, children will require a larger amount of antivenin than adults. This variation in relation to the bulk of the body is due to the relative amounts of body fluids and the resulting body resistance to the venom.

Such are the specific first aid measures that should be taken promptly in case of a bite by a venomous snake. These steps include the three basic ways of combating the effects of venom: restricting its spread (tourniquet), removing it (suction), and neutralizing it (antivenin). If a perfect method were available to accomplish any one of the three, the other two would, of course, be unnecessary. In the present state of our knowledge, all three should be used together and the sooner they are applied, the better. These remarks are applicable for the bite of any venomous snake in the United States except the Coral Snake, for which no specific antivenin has as yet been manufactured. In the very rare cases of bites by this snake, the first aid measures of tourniquet, incision and suction should be employed, although they are not as effective as against Pit Viper venom. In all cases it is important to get to a doctor as quickly as possible without undue exertion on the part of the person bitten. There are a number of additional steps that can be taken by the physician to augment the individual's bodily resistance to the venom and to relieve discomfort. This includes infusions of large quantities of physiological salt solutions, blood transfusions and the administration of sedatives and stimulants as required. Use of the drug ACTH (Cortisone) has been recommended and employed in the treatment of snakebites, but its value has not been sufficiently analyzed as yet.

A few "don'ts" should be mentioned here. *Don't* run, walk or make any physical exertion except as absolutely required to obtain first aid and medical attention. If you are alone in the woods at some distance from help when bitten, begin the first aid treatment and continue it as you *walk* to get assistance. *Don't* cauterize or rub or inject potassium permanganate into the wound. Potassium permanganate will effectively destroy venom in a test tube, but if placed in the wound it destroys the tissues, doing far more harm than good. *Don't* drink whiskey or other alcoholic beverages that will speed up the circulation.

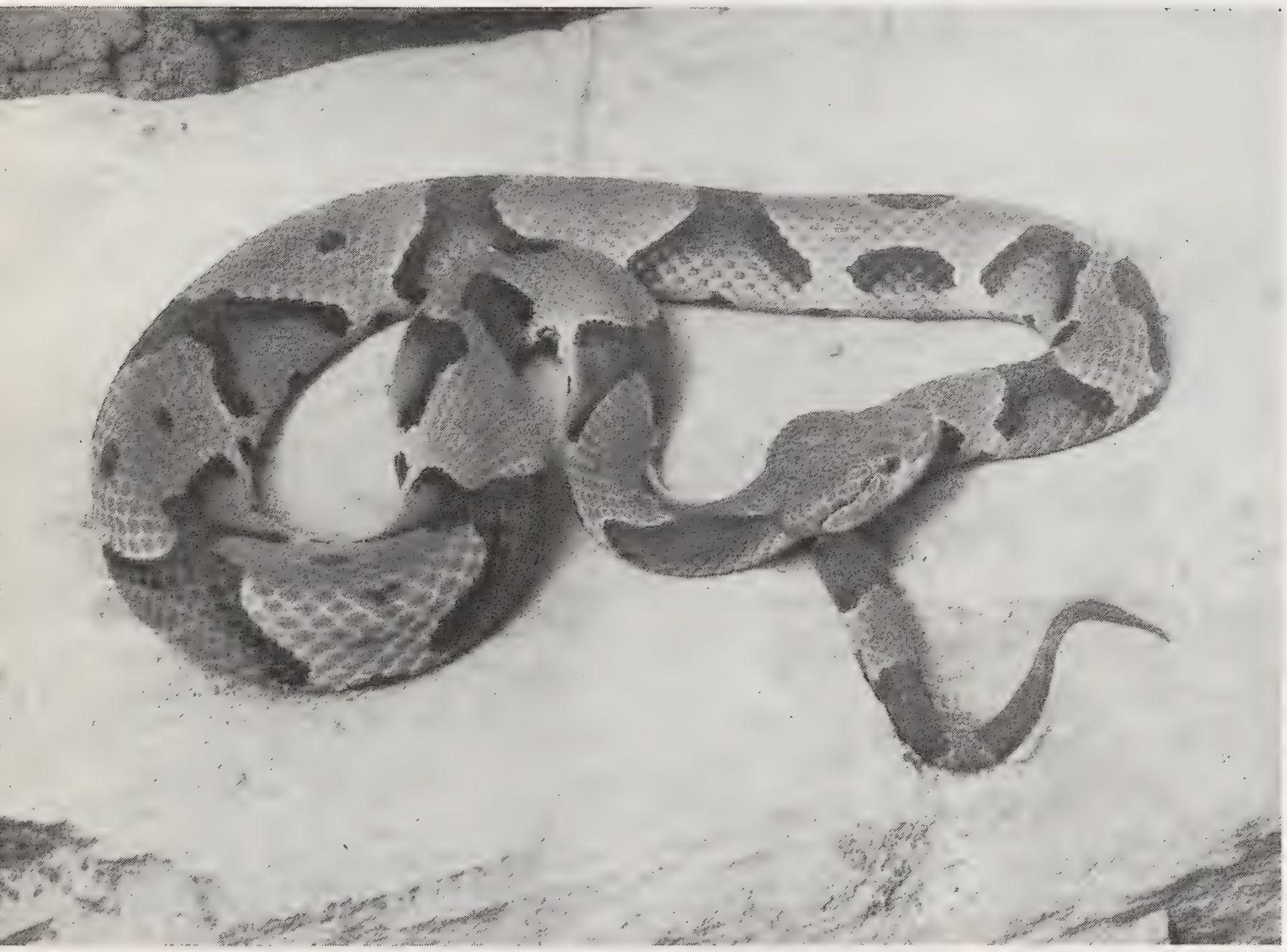


The head of a Western Diamondback Rattlesnake, showing the characteristic facial pit behind and slightly below the small opening of the nostril.

A complicating factor in the treatment of snakebite is that people are sometimes not sure whether they have been bitten by a venomous or a harmless snake. Occasionally this dilemma may result from not seeing the snake that inflicts the bite. More often, it seems to be the result of the individual not recognizing the type of snake. Because of this uncertainty, the painful treatment for snakebite sometimes is given to individuals who have not been bitten by a venomous species. On the other hand, much valuable time may be lost awaiting the appearance of positive symptoms before beginning treatment. Careful examination of the teethmarks at the site of the bite may reveal whether the bite was made by a harmless or a venomous snake. A venomous snake typically leaves two prominent fang punctures. There may or may not be a double row of smaller teethmarks between the two fang marks. In the case

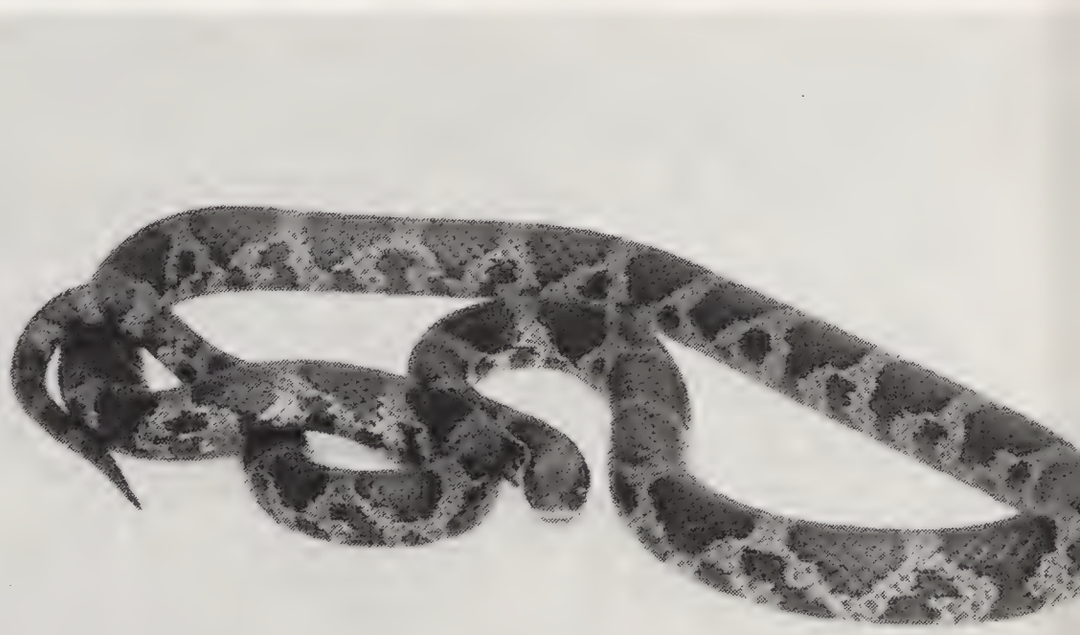
of a bite by a harmless snake there are typically four parallel rows of small teethmarks, with the two inner rows usually longer than the outer. The difficulty with diagnosis by teethmarks alone is that the snake does not always make a "typical" bite.

Obviously the best way of knowing what type of snake is involved in a bite is to learn the different kinds of venomous snakes that may be encountered in the region where you are. This is a relatively easy matter because in the United States there are always fewer venomous than harmless species in any given locality. The number of venomous forms will vary from none, in Maine, to as many as fifteen, in Arizona. Except



Learn to know which is venomous and which isn't! TOP: This is one of the banded Water Snakes, non-venomous, which is sometimes mistaken for the Copperhead. LEFT: The Copperhead's bold pattern, with bands that widen as they approach the belly, is unmistakable. BELOW: The harmless (and beneficial) Milk Snake, or House Snake, need never be confused with the Copperhead. Its bands do not widen on the sides, nor extend all the way down.

for the Coral Snakes that are found in the southern and southwestern states, all of our venomous snakes belong to the family of Pit Vipers. This name is derived from the fact that in all members of the family there is a prominent sensory pit located on the side of the face between the eye and the nostril, as shown in the head of the rattlesnake illustrated here. Thus if you are bitten by a snake whose identity you do not know, kill it immediately if possible and look at the side of the head to see whether or not it has the sensory pit. In making this examination *do not* touch the snake's head with your fingers; use a stick.



The Coral Snakes, of which there are four forms in the United States, can be readily identified by their distinctive color pattern. In the region where the Coral Snakes occur there are several species of harmless snakes that have an amazingly similar appearance. However, the colors are arranged differently and the harmless species can be separated easily from the venomous forms by the color pattern. In the harmless species that resemble the Coral Snake the red color is in contact with the black, whereas in the Coral Snake the red touches the yellow color.

Various harmless water snakes are often mistaken for the two races of venomous Cottonmouth Water Moccasin of the southern states. The venomous species can be identified with certainty by the presence of the facial pit and the fact that on the underside of the base of the tail most of the scales are undivided, forming a single scale across the tail. The harmless species of water snake lack the facial pit and have the scales on the underside of the base of the tail divided, forming two rows of scales. The venomous Water Moccasin is found only in the lowlands of the southern states. Along the Atlantic Coast, it does not occur farther north than Virginia and in the midwestern states it occurs northward up the Mississippi Valley only as far as southern Missouri and southern Illinois. Despite this limited distribution, most water snakes found anywhere in the United States are erroneously called "Water Moccasins."

The Copperheads, comprising four races, occur over a wide area of North America from Texas to Massachusetts. Over much of this region the Banded Water Snake and the Milk or House Snake are frequently mistaken for the Copperhead. Aside from the absence of the facial pit in the harmless species, there are noticeable differences in the color pattern when all three are seen together. In the Milk Snake the large spots on the back do not extend far downward on the sides, and it has a series of smaller rounded spots low on the side. This is in contrast to the Copperhead where the bands go completely from side to side all the way down. They differ further in that in the Copperhead the bands are widest at the bottom. This last feature serves also to distinguish the Copperhead from the banded water snakes, in which the bands are widest on the back.

The rattlesnakes, of which there are more than thirty different forms recognized in the United States, are the most widely distributed of our venomous snakes. Some kind of rattlesnake is found in every state except Maine. The Timber Rattlesnake was formerly found in this state, but has been exterminated there and none has been found since the beginning of the present century. The greatest number of different kinds of rattlesnakes are found in the southwestern states. The rattlesnakes include our smallest venomous snake, the Ground or Pygmy Rattlesnake that is less than three feet in length, and the largest of our venomous snakes, the Eastern and Western Diamondback Rattlesnakes, both of which have been measured at more than seven feet in length.

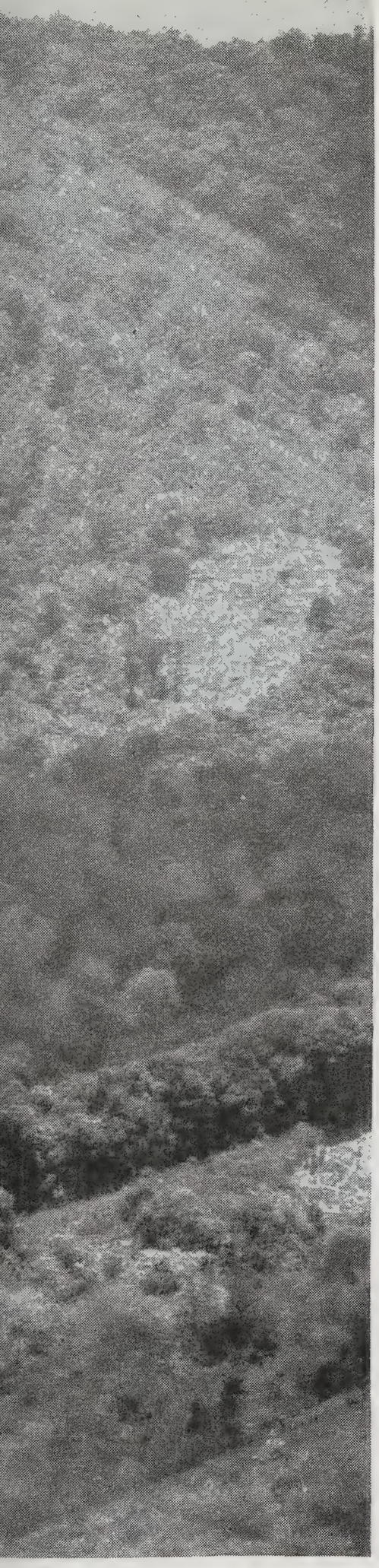
Rattlesnakes can be identified by the rattles at the end of the tail. There is a popular misconception that a rattlesnake will always sound its rattle before striking. This sportsman-like warning reputedly makes the rattlers the gentlemen among snakes. Unhappily, many rattlesnakes do not practice such a romantic code of ethics and may strike without ever rattling.

It is beyond the scope and intent of this article to provide detailed information on the identity, distribution and habits of all of our venomous snakes. Anyone who spends much time in the country should acquaint himself with the types of venomous snakes he may encounter, as well as the harmless species that might be mistaken for the dangerous ones. There are a number of popular books available on the snakes of the United States that provide information on the identification and habits of these snakes. Two inexpensive booklets, authoritative and well illustrated, have been published by the New York Zoological Society — "Snakes of the Northeastern United States" and "Poisonous Snakes of the New World," both by Clifford H. Pope. Other and more elaborate works are available through booksellers. The most recent is "Field Book of Snakes of the United States and Canada," by Karl P. Schmidt and Dwight Davis. Also valuable to have or consult are: "A Field Book of North American Snakes," by Raymond L. Ditmars; "Snakes Alive and How They Live," by Clifford H. Pope; and "Reptiles and Amphibians of the Northeastern States," by Roger Conant of the Philadelphia Zoo.

"SIMLA" IN PICTURES

FOR A LONG TIME *it has seemed to us that Dr. William Beebe was holding something back. It is true that he has written articles about his Department of Tropical Research laboratory at "Simla," in the Arima Valley of Trinidad, and that our January members' meetings have been enlivened by Jocelyn Crane's astonishingly beautiful motion pictures of Simla's scientific work. But, somehow, the human side of the laboratory never received much emphasis — the staff's problems, their techniques, the routine of their days and nights. It seemed to us that an interesting picture might be developed around the research methods of such a laboratory in the tropics, so early in April Sam Dunton, our Staff Photographer, and William Bridges, Curator of Publications, flew to Trinidad. You'll see the results, in color, next January at the members' meeting.*

This is
the sta



OUT OF THIS WORLD

By WILLIAM BRIDGES

AT THE MOMENT this line is being written it is two minutes past ten o'clock on the night of April twentieth. The place is Simla, the laboratory of our Department of Tropical Research in the Arima Valley of Trinidad, and everyone else in the valley and in the laboratory seems to be asleep except Will Beebe and Jocelyn Crane and myself.

The laboratory is dark beyond the pools of yellow light on our three tables. It is a warm darkness just outside the open doors but it deepens to intense blackness where the forest begins a few yards away, and it fades to faint starlight above the western ridge of the mountain.

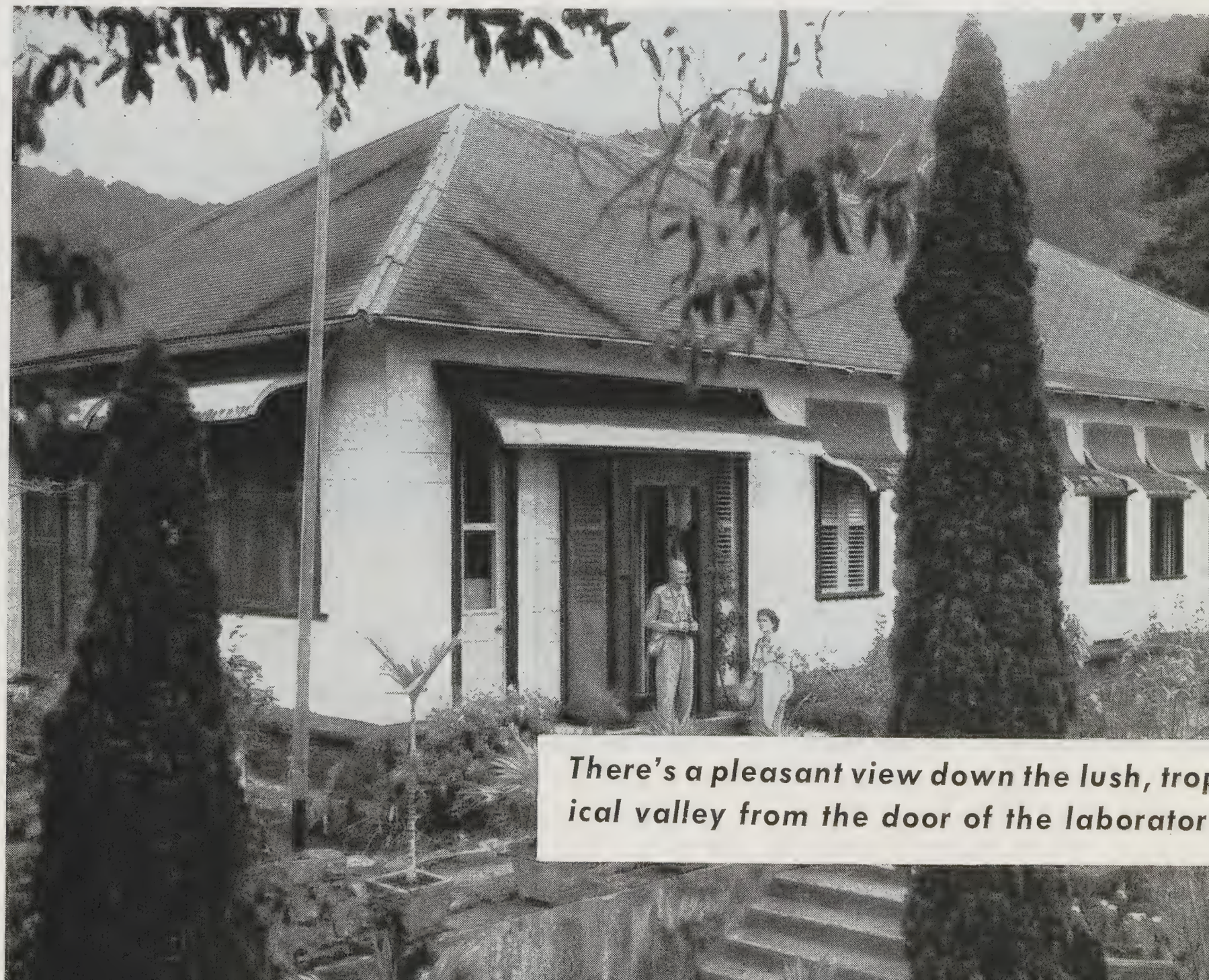
There is absolutely nothing unique or historical about this particular moment, but just the same I wish I could preserve it in words. A photograph wouldn't do it, because that would leave out the clacking and squeaking of my typewriter, the sound of glass clinking against glass as Jocelyn tips preserving alcohol into a vial, the sweetish odor of the alcohol that the night wind carries across the laboratory, the ticking of the clock, the rumbling hollow cry of a *Bufo marinus* down on the river bank and the creaking of his chair as Will turns to lay a folder of notes on the shelf behind him.

Those are the sights, sounds and smells of this particular moment in eternity, in this particular spot. I don't know what Will and Jocelyn are thinking – they appear to be intent on the manuscripts and vials on their tables – but up to now I have been thinking mostly about the visitors we had this afternoon. Pleasant people, but practical people. I took a walk with one of them, up the trace (as they call a path here) that leads to the spring. We strolled past the twelve straight, sturdy mahogany trees that are Will's pride and joy, and our visitor glanced up.

"Splendid trees, aren't they? But of course those wild pines ought to be removed. Mosquitoes. Very fond of breeding in wild pines."

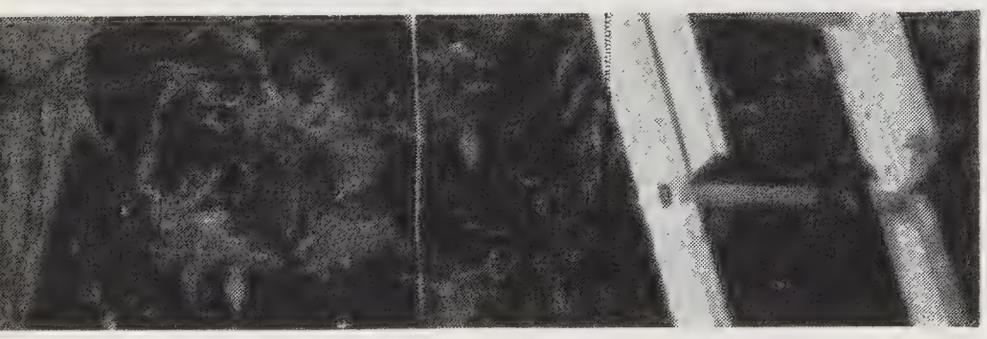
There was no point in my setting him straight, but if he says that to Will, he'll be informed in no uncertain terms that the wild pines (i.e., bromeliads) are

f Simla: the laboratory and
Crane, Ordway, Fleming.



There's a pleasant view down the lush, trop
ical valley from the door of the laborator

Staff Photographer Dunton found himself in quite a number of odd places at Simla.



not going to be removed, mosquitoes or no mosquitoes. Why, in any one of those bromeliads you can find snails and spiders, insect larvae of a dozen kinds, worms, ants, maybe tiny fogs, certainly microscopic life in abundance – enough life, in fact, to furnish out a whole biological laboratory with a year's work.

I've been thinking, too, about some other casual comments by our visitors. The bubbling lady from Port-of-Spain who thought Simla was adorable, but wouldn't it be nice if one's friends could be induced to build country houses on the hills roundabout so there would be company in the evenings. And further back to the woman who dropped in unexpectedly one night and found Jocelyn stooped over a microscope. "Does Dr. Beebe make you work at night? How awful!"

* * *

Having been thinking about things like that, it is not surprising that at two minutes past ten o'clock it suddenly occurred to me that we are out of this world – the world that thinks in terms of buildings and crops and political maneuver, of whirring engines and streets full of people and social evenings at bridge. You always have that feeling of detachment, of course, if you have anything to do with the so-called pure sciences, but it seldom strikes you consciously and acutely as it did me at this particular moment. Here were a couple of people sitting up late on a Sunday night in a laboratory perched on a mountain spur in Trinidad, slaving away at something that will never make the world a dollar richer, but only maybe a little wiser. You could duplicate the scene in scores or hundreds of laboratories around the globe at this instant, where other men and women are working at desks like these, under identical gooseneck lamps, or lanterns, or in sunlight, and if you're a practical person who sees bromeliads only as a breeding place for mosquitoes, black sage as a hazard to the cacao crop instead of a haven for butterflies, and the pressing forest as an unsightly wilderness that ought to be cleared away to keep insects at a distance – well, that's all right, but you wouldn't be very happy at Simla, or in any other field station where (as Will Beebe says) naturalists are trying to learn something about something.

And while I'm about it, the title of this piece suggests a different idea. Here at Simla we *are* out of this world, in motives and behavior as surely as in space, but there's another meaning that could be extracted. I'm thinking about the world Will Beebe has been creating all these years by the distillation process of his imagination and perception. There he sits under his little yellow light, turning the pages of his notebook, twisting to peck at his typewriter with two fingers. He has gone around the world to study pheasants, down in the sea to study bathypelagic life, to Bermuda, to British Guiana, to Venezuela, finally here to Trinidad, to "learn something about something." I suppose he is a practical enough fellow in his way – you wouldn't call him exactly a "long-haired" scientist! – but he hasn't been concerned about the practicality of his concerns, any more than any other dedicated naturalist. His world has always been the natural world, and out of this world he has known how to extract a vision the rest of us can share. I think that's a pretty good accomplishment.

Life in a tropical field station is seldom as relaxed as this indicates. A Berbice chair happened to be under the gigantic saman at St. Pat's, next door to Simla, and Dr. Beebe halted to spy on a hummingbird feeding in a clump of scarlet orchids.

Behavior Is Contagious, Too

By EDWARD A. ARMSTRONG

ONE OF THE MOST REMARKABLE EXPERIENCES the naturalist may enjoy is the sight of a large flock of birds or herd of mammals manoeuvring together. No longer may enormous herds of Bison be seen stampeding across the prairie and the herds of migrating Caribou are not as impressive as they were when the first white trappers went north, but in Africa, as a recent film reminded us, awe-inspiring numbers of large animals may still be found.

It is not surprising that the sight of huge herds in motion should have impressed men of the distant past. In the caves of southern France have been discovered fragments of bone engraved with vivid representations of galloping herds of Reindeer and Wild Horses. They are among the most

exciting surviving relics of the works of prehistoric men, for they suggest not only the characteristics of the animals but also the sense of swift, corporate, motion. As we look on these sketches, with the aid of a little imagination we almost hear the thunder of hooves echoing down the ages. Perhaps, as some scholars believe, these drawings were made with the intention magically to increase the numbers of the animals or to render them more easily approachable by those who would slay them. One wonders, for example, whether the engraving from Ariège showing a man wearing a deer skin and antlers depicts, not a magician in the full sense, but a man who exercised the craft of luring animals near to where the hunters were in ambush. Whatever the explanation of these scenes may be, they show that men of the Stone Age were impressed, as we are, by the concerted movements of a large number of animals. If we are seldom able to see herds of antelopes or other ungulates in full gallop, most of us have opportunities to watch the marvellous evolutions of flocks of Starlings or wading birds, swerving by and banking with astonishing unanimity. Even so common a sight as the flight of a flock of pigeons deserves our admiration.

A herd of Pronghorn Antelope flees, as one animal, across the vast tableland at Pitchfork, Wyoming. A warning signal is the white rump flashing in the sun.

Charles J. Belden Photo

We are so familiar with the activities of birds in which one copies the behavior of another that their significance may not be immediately apparent. We have all watched a flock of ducklings waddle away in a compact group or noticed how, when a sparrow is alarmed and flies up, the whole of the little flock often flies with it. It is worth while to ask ourselves, What is the psychological basis of these forms of behavior and what functions do they serve?

The function of corporate flight is fairly obvious. The fleeing of one member of the group is in itself the signal for others to act likewise — though such action is often emphasized by a warning call. Very often the individuals do not wait to spy the dangerous object for themselves. Among birds, the sight of the uplifted wings of a companion is sufficient to initiate the same action by all the members of the flock. Often, indeed, they take flight needlessly, but it is better to be safe than sorry, and one day the persistent laggard will fall victim to a marauder. Large birds which roost on the ground are particularly vulnerable and it is noteworthy that one of these, the Partridge, employs two "safety devices" — the birds roost together in a covey and when one is alarmed all disperse in different directions. Moreover, on taking flight the birds rocket straight upwards. The prowling fox must often be baffled. There are tropical species of butterfly which roost in clusters and take flight together when disturbed. In such circumstances a predator is liable to be somewhat bewildered, just as he may be when a whole brood of young birds bursts forth from the nest. Sometimes he may muff his pounce and go hungry.

Among very social birds it is common to find that either the wings, rump or tail bear some distinguishing mark so that they render the individual's alarm-flight more conspicuous, or facilitate a following movement by the leader's fellows. Similarly the white tail of such an animal as the Virginia White-tailed Deer serves both as an alarm which sets off similar stampeding on the part of others and as a marker for them to follow. The point of special interest is that a badge or signal adornment is involved which is additional to, or accentuates, the fleeing movements which are usually sufficient in themselves, among strongly social animals, to initiate similar movements by others. Off goes the signal, bang goes the reaction; but the factor of primary importance is the tendency of one animal to react as it sees another doing.

The susceptibility to do as others do is conspicuous in regard to a quite different type of behavior. It has been noticed that the sight of an individual eating stimulates others to eat also. Thus men, birds and fish eat more in company than when alone. Place a well-fed hen with a party of hungry birds busily pecking up meal and it will begin to do the same, although it does not need the food. Perhaps some tummy-aches after children's parties are due to a somewhat similar impulse! More remarkable is the fact that a hungry bird placed with satiated birds may behave as if it, too, had eaten well. Konrad Lorenz, the Viennese ornithologist who has con-

Pigeons wheeling in unison above the rooftops of the city are a familiar sight, but always a spectacular one. Pigeons flock naturally, but they are trained to fly around a rooftop loft.

tributed so much to our knowledge of bird behavior, had two groups of Night Herons, one in an aviary, the other outside. After the birds in the cage had been fed they perched in the lethargic, hunched-up attitude which might have inspired the poet's line, "Irks care the crop-full bird?", whereupon the hungry Herons outside assumed the same posture, as if they, too, were replete! Thus the tendency to do as other do, so far as these birds were concerned, dominated their hunger. Its potency must at times be very great, to over-ride so powerful a craving.

In yet another sphere "suggestibility" plays an important rôle. Set a vigorous man to work with an easy-going gang and you will probably find that he, too, will take things easy. He may not do so intentionally; he just falls in with the rhythm of his mates. The influence of one's fellows is similar in ant society. The author of the Book of Proverbs was wiser than he knew when he wrote: "Go to the ant, thou sluggard." A Chinese investigator, Chen, found that an active *Camponotus* ant placed with go-slow workers reduced its tempo but, on the other hand, a lethargic individual speeded up its efforts when associated with industrious companions. La Fontaine might have written an ingenious fable about this, but moralizing about such phenomena is out of style today. It is of sufficient interest to note that such similarity of behavior between organisms so different suggests that in at least this respect it is not fantastic to see something in common between the mentality of man and ant.

When engaged in photographing gulls nesting in a large colony, I have been impressed, as have many others who have studied such birds, with the extent to which the initiation of one form of behavior spreads from one individual or a small group to many others, so that one naturally thinks of this phenomenon as "contagious" behavior. If one bird calls, cries may forthwith resound from all over the colony, and at times a large number will start preening, infected by each other's example. Every now and then scores or hundreds fly up and circle around together for no obvious reason, though probably one bird, taking fright at some harmless sight or innocuous experience, has thereby aroused the whole company. Watching Black Guillemots in the bay on whose shores their nests are situated one sees a group performing quaint water-dances arranged in fours or, perhaps, in single file. Subsequently, they all fly around together with the white patches on their wings twinkling, and when they alight they wheeze and bicker together. Community feeling dominates their activities. Every naturalist could quote experiences with one social species or another of a similar nature. Cormorants perform various activities together and the sight of a pair fighting is often the signal for several other birds to join in the affray as if they had decided no fight was a private affair but every squabble should be regarded as a free-for-all. So deep-seated is this tendency that the activities of a bird may elicit similar activities from an individual of another species. A male Shoveler Duck which flew over where a female Mallard was "injury-feigning," came down and performed in the same way. In Iceland I have seen a Dunlin feeding with Golden Plover and copying their actions;

when they flew it flew with them also. Such behavior is so common on the part of the Dunlin that the Icelanders name the bird "The plover's slave." Captive cranes can sometimes be induced to perform their nuptial dance if their keeper capers before them!

It must not be thought that because birds and other animals will copy each other in stereotyped and even incongruous ways that therefore their behavior can be explained by rule-of-thumb methods. For example, where learning is concerned, animals differ a good deal in the extent to which they are helped or hindered by being members of a group. Goldfish learn a maze quicker when in a small shoal than when alone, but Budgerigars are slower in solving such a problem when in company. Their sociability seems to be a hindrance, for they are apt to distract each other's attention from the matter in hand. Cockroaches also learn more slowly when with others. Thus contagious behavior may be advantageous in some ways and not in others. It is, as it were, attuned to the service of the animal's needs.

THUS FAR the term "imitation" has not been used, and for this reason – it is desirable to make a distinction between behavior in which one animal, seeing another doing some customary act, is thereby stimulated to do the same, and true imitation in which copying some novel act is involved. Thus imitation is behavior in which the organism reproduces an act which is not one of those included in its innate repertoire of instinctive acts. When a monkey, on seeing another grooming himself, does likewise, this is not imitation, because learning is not involved. If Pliny had been correct in saying that apes imitate every detail of the hunter's movements, we would have to admit that this was truly imitative behavior but his statement is derived from hunters' imagination rather than fact. I suggest that such acts in which like elicits like and inherited patterns of behavior are involved should be classed as "mimesis." Mimetic activity is common among animals, as we have noted, but true imitative activity is rare. Indeed, some psychologists, such as McDougall, have denied that it ever occurs below the human level of mentality. We need not discuss this matter here. It is sufficient to note that copying or reproducing another's behavior may be on lower or higher levels, involving capacities of different degrees of organization, and that this low-level mimetic behavior characteristic of the lower animals is also characteristic of man. Yawning exemplifies a form of behavior common to man and monkey. Both yawn when bored. Moreover yawning is "infectious," as we have all noticed, and we may even yawn after seeing someone else do so without realizing that our yawning has been mimetically induced.

In some forms of hysteria, elements in human nature which bear a close affinity to the mimetic tendencies of animals make their appearance or, as we might justifiably say, "come to the surface." In Malaya natives are subject to an affection called *lâtah* which is of such a nature that those afflicted are possessed by an irresistible impulse to copy the movements of other people, animals or objects. A man will sway rhythmically to the swaying of a clump of bamboos or mimic the actions of somebody else. There is a story told of a Malay, affected by this malady, who observed a Tiger advancing toward him. Thereupon he began to imitate the beast's every movement. The Tiger fled. The tale may be *ben trovato* but many authenticated instances of the peculiar behavior of those suffering from *lâtah* are on record. In Siberia a malady of similar character occurs. A Russian writer describes an episode in which a company of the 3rd Trans-Baikal Cossacks was involved. The men began to imitate their commanding officer, echoing his commands and then his curses. The sequel is not on record!

There has been space to mention only a few illustrations of contagious or mimetic behavior among man and animals, but they are sufficient to show that "suggestibility" can be traced back to our animal ancestry. It is a quality which can lead men to disaster. We cannot forget those full-throated choruses of "Heil Hitler" and "Sieg heil" which the radio transmitted to our firesides from the Nazi rallies. The despot and the quack know how to exploit man's mimetic tendencies, and men as well as swine may hurl themselves with Gadarene blindness to destruction. Yet this very faculty is of inestimable value. It is the cement of society. Through it men can be of one mind in a house and in a nation. Mimesis is the foundation of cooperation in human society as among animals. It may be the means of ruin, or a powerful creative force for good.

SPRING comes to Jackson Hole

By TOM McHUGH

With Photographs by the Author

A HOWLING FEBRUARY BLIZZARD drifted more snow about a small rock cave in Jackson Hole, Wyoming. It blotted out trees and rocks and swirled into the crevices. Deepest winter, one would say. Yet now and then between the wailing blasts the first sounds of spring began to filter out of the cave. Just a few whinings and whimperings.

The sounds went largely unnoticed, for there are few residents in this wilderness of snow. Perhaps the Mountain Chickadee snuggling deep in the branches of a nearby pine heard them. And of course the bear sleeping in the back of the cave was well aware of them. She brushed a paw against her newborn twins as they alternately nursed and whined.

It is difficult to imagine how the young of such a large beast could be so small. Each cub was only about eight inches long and weighed less than a pound, or about 1/300th of the mother's weight. They had no teeth and were clothed with

The iridescent Mountain Bluebird nests in a disused Flicker hole.

such a thin layer of hair that they were practically naked. Their eyes were still shut. Their mother curled around them to keep them warm.

We may be astonished at their size, but tiny cubs are really most practical. They would have to live off food stores from the mother's body for the next two months, for not until April would she wander out of the den for more food. That such small cubs do not make excessive demands on her food resources is shown by the fact that both mother and cubs emerge in good condition. Larger cubs would probably leave her emaciated.

In April, spring and winter start fighting for supremacy, but winter wins most battles in the mountains. There are still one to two feet of

The Marmot emerges from his rock pile to greet a belated spring in the high mountains. This is a typical alert posture.

Clouds rolling in over the Teton Mountains may unload rain or even snow during the spring-time months of May and June.

Bear cubs are born in a den during the deep winter, but they are old enough to follow their mother out in late April. They are full of energy at this time and much of their day is spent in scampering play.

snow on the ground, and the temperature often stays around freezing. Nevertheless, a few robins and bluebirds push into the area. And on the first warm day, the bear family emerges.

The mother eagerly plods through the spongy, half-melting snow, leaving a series of deep holes behind her. The cubs follow much more slowly. They tumble into the deep holes and can scarcely waddle out to the next. They high-center in the soft snow and have to paddle out again. They lag behind and prompt their mother to sit down and wait for them.

When the old one arrives at a snow-free, south-facing slope, she starts to eat grass. But the cubs still have plenty of energy left for play. They wrestle and box and chase each other. One sneaks up behind the other, pushes him into a puddle and then scampers away to avoid reciprocal splashes. They fight over a snowball and then are most puzzled when it disintegrates under their struggles.

All this frolic suddenly stops, however, when the mother growls a warning signal. They have learned already that a sharp cuff is the punishment for not heeding the commands of the old one. Immediately they scamper into a large spruce, climbing seventy feet up with the agility of a squirrel.

Meanwhile, the mother stares toward the brow of a nearby hill. She climbs to a low limb in the spruce, bares her teeth in a vicious growl and then quickly descends. The object of her threatening glances is a male bear that had accidentally or

purposely wandered into the area. It was probably with evil intent, for he knew only too well how tasty small cubs are.

While the cubs crawl still higher in the spruce, the female rushes at the challenger. The resulting chase is so close the two bears appear as one. Suddenly the male stops, turns and rears up on his hind legs. The female takes the same pose. The battle that follows is identical to a heated prize fight with the exception that every punch finds its mark. After several exchange slaps, the chase starts again and the mother finally bluffs the male off her land.

With the "all clear" signal from the female, the cubs slowly work their way back down the spruce.

Like the bear cubs, other Jackson Hole youngsters must continually wage a battle against the forces of the wild. They are threatened by predators which are lean and hungry after struggling through the winter. And they must fight snowstorms which continue until June.

In the snow-speckled April meadow, another new youngster has just arrived. A few feet from the edge of the Buffalo herd a cow licks the matted fur of her calf. Two young bulls walk over to inspect and help lick the new arrival. Overhead, two circling Ravens eye the calf with other thoughts, and as the cow moves a few feet away to graze, they land and hop forward. The eyes of helpless animals are their favorite delicacy. As they near the calf the cow quickly wheels and charges. The Ravens fly out of her reach, but they still keep close by. Finally, the cow has to stand sentry duty above her calf to make sure the Ravens will not sneak in.

Within less than an hour, the calf takes his first steps. With his bowed limbs he gives every appearance of being a giant daddy longlegs. Slowly, he spiders his way after his mother. Shortly, the two of them may be running on mass stampedes with the herd, and then the youngster will be at the mercy of the thundering hoofs of the older bulls and cows, for they play no favorites. A young calf must constantly beware the menacing blows from the hoofs and horns of other buffalo – or perish.

It is doubtful that any calves now fall to predators, for the buffalo cow will defend her calf against all enemies. If she is losing the battle, she can always depend on help from the herd.

Last spring a Yellowstone Park ranger found shreds of circumstantial evidence to prove this. In the center of a heavily trampled piece of meadow he found the battered carcass of a large Grizzly Bear. All the ribs on one side were broken. Two holes were punched in its side. The entire area was strewn with pieces of Buffalo and

The Buffalo cow loyally defends her calf against Bears, Coyotes and Ravens, but the calf must be continually alert to dodge careless hoofs or purposeful jabs of the horn by other adult Buffalo.

Grizzly Bear fur. Although no one saw the actual battle, it is quite possible that the Buffalo was defending her calf against this most powerful predator.

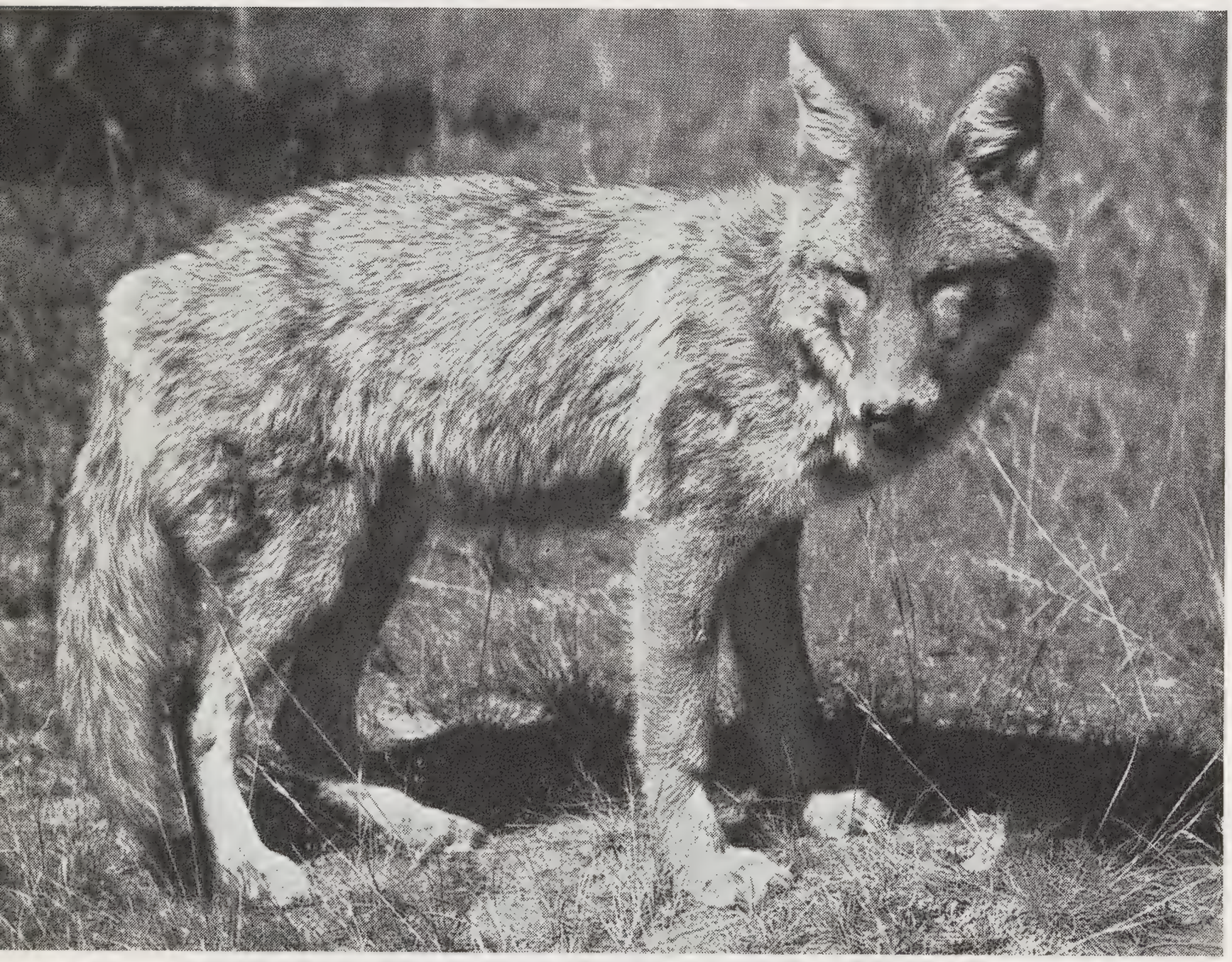
When the snow banks slowly disappear in April to give the first indication of spring, the Elk migration starts. Thousands of Elk which were kept low in the valley by a fence of deep snow now push through the disintegrating barrier. Small groups of five to twenty split from the main herds and start pushing toward the high country. The groups start off with both cows and bulls.

Toward the end of May, however, the groups break up. Pregnant cows slow down, drop out and look for calving grounds. The bulls push past these maternity wards, ever marching on toward the high mountain meadows. Even though the days will be freezing at that altitude, they will taste the first flowers of spring.

Three Elk cows caught my eye on a low, marshy meadow. As I approached, they suddenly rose, froze for a moment and then began prancing off across the meadow. But their retreat was not a rapid one. Rather, it was a slow and worried escape. They would run a few yards and then pause and look back, ears attentive and eyes anxious. Then they would circle the meadow and again stare at me. It was just the type of behavior I was looking for; these cows were inadvertently giving away the fact that somewhere in the meadow they had hidden their new calves.

Knowing where the cows had just been was no accurate clue to the location of the calves. The cow might bed down for the day and then sneak off at dusk to nurse and lick her hidden calf. Under small bushes, behind clumps of grass — I searched everywhere as I crossed back and forth over the meadow. Finally, I spotted the calf in a small hollow in the meadow: I was sure I could make out the spots on its back and the outline of its head. I rushed to the spot and found only a "mirage," a twisted mass of dead reeds that fooled me completely.

A few feet farther on I spotted another likely-looking object. From ten feet away it looked like no more than a rotten log with a few sunflecks. Look more closely, though! This time it *is* the reddish-brown calf, lying there with its head tucked neatly on its legs, its ears laid back and its eyes open to watch my every move. It looked dead, but the rhythmic breathing of its body shattered this thought.



Coyotes consider spring a season of plenty. They may feed on the carcasses of winter-killed animals, which are always numerous, or they find an abundance of baby birds and mammals.

By freezing in such a position, calves usually go unnoticed. Furthermore, their scent is so weak that few predators get close enough to detect it.

When a Coyote locates a calf, the cow immediately rushes over to drive it away with flailing hoofs. But while she is busy chasing away one Coyote, another may creep in and snap at the calf before she can return to it. When more than two Coyotes play the grim game, the Elk cow has little chance of saving her calf. Weak and exhausted, she can protect her calf only by standing directly over it. The Coyotes finally move in and kill the calf under her body.

Calves normally remain hidden for two or three weeks. Eventually, however, they revolt against this depositing technique. When the calves continually get up against mothers' orders, the cows finally let them have their way. Once again, the cows with their new calves resume the migration and push forward toward the high mountain meadows.

Also in late May, the Moose calf arrives in a shady willow tangle. Within a few hours after birth it starts to follow its mother, but the first attempts at walking appear doomed to failure. The calf looks like a body mounted on tall, slender bamboo shoots as legs. The stilt-like legs bow in and out and give every appearance that the entire animal will shortly be lying in a tangled heap on the ground. Momentarily the rear half of the calf starts to sway sideways and is saved from near collapse only by a quick step forward.

Within a few days, the Moose calf starts traveling with its cow. At first, it stumbles over logs and occasionally gets caught in willow bushes. Yet it is able to swim almost as soon as it can walk. The mother seldom hesitates to lead her calf across any body of water. If the calf gets tired, it can rest its head on her rump or throw a leg over her neck. She then tows it alongside.

The calf may even take to the water for protection when only a day old. If its mother is not close by when danger threatens, it rushes into the water and submerges its entire body. Only the tips of its nostrils remain above the surface. When the emergency is over, and the calf comes out after as much as one hour's dunking, its fur is still practically dry!

The precipitous ledges and rocky crags high on the edge of Jackson Hole are as much a place of safety for the Bighorns as the willow tangles for the Moose. When the lamb is about to arrive, the ewe retires to a steep cliff where she can spot approaching enemies from a good distance. The first lamb is likely to be born on a gravelly, near-vertical delivery table. A half hour later its twin arrives. The helpless creature lies for a moment on the loose gravel and then starts to slide down the steep bank. A few feet ahead looms an abrupt precipice with a drop of a hundred feet to the sharp rocks below. The ewe quickly senses the danger, jumps over the skidding lamb and paws out a small notch in the cliff. The lamb skids to a smooth stop in this.

By the time most of these big game animals have borne their young, spring has distinctly arrived in Jackson Hole. Now, in late May, only a few stubborn snow drifts dot the valley floor. The aspen groves respond to the warmer weather (it goes below freezing only occasionally now) with a flurry of crisp, yellow-green leaves.

And in the aspen grove the most characteristic

Moose cow and calf are inseparable for at least a year. During the day they hide in the dense willow tangles, but they emerge to feed in the cool, early morning, or late in the afternoon.

The Tree Swallow alights on the lip of its nesting hole in an aspen tree. A pair of Flickers made the original excavation, nested in it, and then moved on.

residents finish their courtship dance. Male and female Red-naped Sapsuckers face each other on an aspen stub, bob and salaam, bend their bodies from side to side and constantly wave their bills at each other. The result of all these exercises is a mating bond which eventually yields a nestful of youngsters.

First must come the nesting cavity, however. The female sapsucker is very wise in her choice of an aspen tree. Aspen grows quickly and also disintegrates equally as fast. By the time a tree is large enough for a sapsucker burrow, more than half of the wood has started to decay. Only the outer shell of the trunk is solid enough to support the tree. This one- or two-inch layer will give the sapsucker the most trouble.

She starts with a small hole and gradually widens this out by chipping away small bits of wood. By the time she works to the spongy core she will be able to chip more rapidly on the gourd-shaped excavation.

As the hole gets deeper the pile of chips begins to hinder progress. She gathers these in her bill and dumps them out the nest entrance.

After a week of using her bill as a chisel and her head as a hammer, the nesting cavity is complete.

The Red-naped Sapsucker is the carpenter of the aspen colony, for it is largely through the home-building efforts of this one species that many other birds are brought into the area. Each year the sapsucker usually insists upon a new excavation, and each year its abandoned nesting holes serve as homes for other birds. Other hole-drillers, like the Red-shafted Flickers and Downy and Hairy Woodpeckers, may occasionally chisel out their own nesting excavation. They are not as industrious as the sapsucker, for they frequently use one of the previous year's cavities.

Even the tiny chickadee may occasionally dig its own home in the aspen. Since it cannot pierce the tough outer layer with its weak bill, it must use some break in this shell to gain entrance to the rotten interior. Often a hole made by some woodpecker in search of a grub serves this purpose. Then the chickadee industriously chisels this into a cavity nine or more inches deep. Unlike the woodpeckers, it is clever enough to carry away the betraying wood chips and scatter them over a wide area.

If the sapsucker is the main carpenter of the aspen grove, aided to some extent by woodpeckers and chickadees, who are the roomers that later use the abandoned homes? Violet-green swallows, Tree Swallows and Mountain Bluebirds fill the spaces.

Where the sapsucker was satisfied with merely a few wood chips for her nest, these other birds are more particular. They construct their nest of grass, strings, twigs and feathers. And to build this seemingly simple nest, they may take three times as long a period as the sapsucker took to first excavate the nesting hole.

Since many of these birds are abundant in Jackson Hole, the demand for nesting cavities is often greater than the supply. Where excavations are numerous, as in a particularly well-riddled tree, swallows form colonies.

One "aspen tenement" held bluebirds on the first floor, flickers on the second and Tree Swallows above them. There were even backyard

squabbles as the small yet agile bluebirds and swallows dived at the clumsy flickers to try to drive them out.

In June, when summer is starting to arrive on the valley floor, spring is just blossoming in the high mountains surrounding Jackson Hole. A trip up to 9,000 feet revealed a land of ice and snow.

When we first emerged from the tent one morning, our breath was quite visible in the crisp morning air. After breakfast, the first sign of wildlife was a marmot that peeked at us around a rock. He contemplated us with a quizzical and hungry eye, or so it seemed from subsequent events.

A few minutes later we became aware of noises behind the rock. Cautiously, we crept to the top and peeked over. We needn't have been so cautious, for the noise-maker, a marmot, couldn't see us anyway. He had firmly stuck his head into a date bread can. As he walked rapidly forward, he resembled some sort of tank pushing its way among the tin cans. Then he would stop and jump up in the air, twisting back and forth as he fell. Evidently, he expected the can to remain up while he wiggled out. After repeating this dance several times, he ended up on the top of a big boulder. The next leap found him careening four feet off the boulder toward the ground.

Finally, we were able to grab him and pull off the can. A stunned marmot blinked his eyes once and then galloped away to his rock pile.

The rock pile is the most secure animal home in the mountains. The marmot uses it as a bomb shelter against hawk and eagle attacks. The entrance to his tunnel between the rocks is so small that a Coyote cannot squeeze in. The rock pile also is a well insulated place for hibernating, for the marmot is the laziest animal in the high country.

From September to June he sleeps deep under his rock castle. In late June he first comes out to greet spring in the mountains. The snow has just melted away from his favorite meadow, and he rushes out to nip off the first greenish and purplish sprouts.

Later on, the meadow will remain lush as streams continue to trickle through it from higher snow fields. But he will always waddle out into the meadow with caution. There, he is no longer protected by his rock pile. He will quickly gallop back to his burrow if a sentry on top of the rock fortress whistles a danger call.

While the marmot is reveling in his late seasons, spring has long since waned on the valley floor. The bright yellow-green leaves of the aspens fade. And in the nearby stream, the Beavers are already planning for winter.

Toward evening they come up to gnaw on the aspen trees. Big chips fall to the ground as their large incisor teeth bite and pry into the soft wood. Occasionally the stillness of the night is broken by a loud crash as the tree falls and the brittle branches shatter. Almost all the trees fall downhill toward the stream — not because the Beaver is an expert forester but because most of them naturally lean that way.

Next, the Beavers trim off the branches. Some eat the bark on the spot while others clamp their teeth into the branches and drag them to the

A Red-naped Sapsucker brings a viscous mass of insects and pine sap to its youngsters in the nesting cavity in an aspen. Later, other birds will nest here.

pond. They push them deep into the mud to serve as a winter food store when the pond freezes. The thick trunks are gnawed into sections small enough to be handled by the Beavers.

As one Beaver rolls a piece of trunk to the water, bits of twigs and old feathers pour out of a hole in the wood. Yes, this was the bluebird tree. Before the summer is over the entire sapsucker home-building project will be downed.

But the sapsucker project cannot be stopped by a few Beavers. There are still many other aspen colonies, and even this particular one will rapidly grow up again when the Beavers move on to another site.

Nor will the other wilderness creatures be stopped by snowstorms or hungry bears or Coyotes or hawks. The pulse of life in Jackson Hole will continue beating, to bring forth many more springs as bountiful as this one.

Spring is always a stormy time in the Jackson Hole country, and for days Mt. Moran may be blotted out by low-hanging clouds. But these storms are a sure sign of the end of winter.

News from the Conservation Foundation

President Osborn Sails for Europe

ARMED with a long list of British and European conservationists, scientists, publicists and public officials, Fairfield Osborn, president of the Conservation Foundation and the Zoological Society, sailed April 28 on the *Ile de France* for the purpose of reviewing current conservation thinking in continental Europe and Great Britain at close range. He expects to discuss resources and population pressures with some of our scientific advisors overseas as well as other leaders of thought in Western Europe.

His exact itinerary was not complete at the time of sailing, being subject somewhat to the availability of some of the people he wants to see. One of his purposes is to explore the desirability of inviting a small number of leaders of thought, not primarily demographers, to attend a limited conference to be held some time within the next year or so to focus opinion on the world's population problems in relation to resources.

President Osborn also expects to review the progress of the Zoological Society's "Point Four Program" of assistance to European biologists, which was announced at the annual meeting and is now in operation.

Annual Report for 1951

The streamlined annual report of the Conservation Foundation is off the press and has been mailed to the organization's many friends here and abroad. Any member of the Society who wishes a copy may have one on request to the Conservation Foundation, 30 East 40th Street, New York 16.

To encourage the adoption of conservation education programs the report has been sent to the presidents of 46 universities and colleges.

Recent talks with faculty heads at the University of Pittsburgh indicate the possibility of an expansion in the conservation education program of that institution.

Spanish-Portuguese Films Have Washington Preview

Under the auspices of the Department of Economic and Social Affairs of the Pan American Union, the Foundation's Spanish - Portuguese sound-tracked versions of "The Forest Produces" and "Yours Is The Land" were previewed by some 200 persons at Pan American Union Headquarters, Washington, D. C., on Wednesday evening, May 7.

The audience was composed not only of officials from a number of South and Central American embassies and consulates in Washington, but also of a large contingent of Americans who have interests in one or more of the Latin American nations. It is hoped that this auspicious initiation will start our films off to a wide distribution in South and Central America. All the film production of the Foundation has now been sound-tracked in both Spanish and Portuguese, and natives from such countries as Brazil and Mexico have expressed themselves as of the opinion that these pictures will be helpful to the conservation cause in Latin America.

The "Living Water" series is nearing completion, and will also be prepared with sound-track for South American sale. The U. S. State Department has purchased a number of copies of "The Web of Life" for sale in foreign countries.

New York State Teacher's Guide Now in Preparation

The Conservation Teacher's Guide for use in the school system of New York State has been unduly delayed by the difficulty of deciding upon the proper person to prepare it. This person has now been found and has been commissioned by the State to complete the guide along lines agreed upon in conferences in which Foundation staff members participated.

This Guide is sponsored jointly by the State Departments of Conservation and of Education, as well as by The Conservation Foundation.

BEHIND THE SCENES

NEWS AND NOTES OF THE ZOOLOGICAL PARK, THE AQUARIUM AND THE DEPARTMENT OF TROPICAL RESEARCH

Four More Tiger Cubs— Other Animal News

Dacca, our prolific Tiger mother, produced her fifth litter on May 1, this time two males and two females. The babies are being reared by their mother, in the seclusion of the sleeping compartment in the Lion House, and will not be on exhibition until they are old enough to wander out by themselves about the middle of June.

* * *

Two nestings in the Zoological Park are being watched with great interest. A pair of Mute Swans built a nest on the shore of the little lake just south of the Zebra House and deposited four eggs. One set of vandals was driven off when a Pony Track attendant saw them beating the nesting bird with sticks; a few days later a boy was captured by a Children's Zoo attendant with all four eggs in his pocket. The eggs were returned and the Bird House keepers rigged up a high wire fence that now makes access to the nest extremely difficult for everyone but the swans. If their eggs are fertile, they should hatch about June 1.

There are 34 Giant Neotropical Toads in this heap as Dr. Oliver prepares to pack them in damp moss for shipment to the Max Planck Institute in Westphalia, under the Zoological Society's own "Point Four" program of aid to European biologists. The toads were collected by our Tropical Research laboratory in Trinidad.

The other nesting (besides the usual Canada Geese and Mallards and Black Ducks that try to nest around our ponds each year) is that of the pair of Darwin's Rheas. Attempts to incubate the first two eggs were unsuccessful; they were not fertile. Subsequently the birds' corral at the Ostrich House was enlarged and the male has built a nest and is sitting on two dummy eggs and two real ones. We still don't know whether the real ones are fertile.

* * *

Cecil and Penelope, the Duck-billed Platypuses, were taken out of "winter storage" and given the run of their summer Platypusary on April 21, almost three weeks earlier than last year, in the hope that by an early start we would catch the beginning of what would be the Platypus breeding season in Australia. If Penelope gives no indication of egg-laying by late June, the breeding attempt will be abandoned and the Platypusary opened to the public for an hour each day, as in the past.

* * *

At his latest weighing, in early May, Herbert the Walrus weighed 487 pounds, and by early June should be well over 500 pounds – a good start on his eventual 3,000 pounds, since he is only a year old this spring. In preparation for the hot summer months, the Construction De-

The Children's Zoo reopened for its twelfth season on the Saturday before Easter and almost immediately—as soon as the weather settled—began breaking records. There were 7,750 visitors on Sunday, April 20, and a new high was set on the warm Sunday of May 4, with 8,049 visitors.

partment has erected a stout awning frame over a section of Herbert's pool and he will be able to take shelter from the summer sun. To date, on even the warmest and brightest spring days, he has shown no signs of distress and his appetite continues to keep pace with his weight.

Staff Presents Four Papers On Cancer Research

Cancer research has assumed increasing importance in our Aquarium laboratory in recent years and our Genetics Laboratory, under Dr. Myron Gordon, is almost exclusively concerned with the tumors occurring in Platyfish and Swordtails. From this work came four papers presented at the meeting of the American Association for Cancer Research in New York on April 11-13.

Dr. Nigrelli, the Aquarium pathologist, and Dr. Sophie Jakowska of the College of Mount St. Vincent described a tumor from an African Lungfish, of a type never before found in fishes. Dr. Gordon and Dr. Recai Ermin of the University of Istanbul reported on experiments comparing the regeneration of normal fish fins and those bearing melanotic tumors.

Dr. Nigrelli gave a paper on abnormal thyroid growths in marine fishes, of special interest because they demonstrate that an environmental lack of iodine is not always the cause of goitre-like growths, and Drs. Gordon and Berg and Miss Martha Edgar analyzed the development of thyroid tumors in one of the Genetics Laboratory's strains of Montezuma Swordtails; a tendency to develop this particular type of tumor seems to be inherited.

Dr. Gordon spoke on "The Influence of Heredity in Melanoma Development" at a symposium of fundamental cancer research in Houston on April 25-26.

This is one of the out-of-doors compartments at the Great Apes House, showing how it has been rebuilt so that there is a gradual descent to the shallow water at the bottom. All five compartments are rebuilt and in use now.

Garden Party Date: June 19

Announcements will be mailed in a few days of the program for the annual spring members' party at the Zoological Park. It will be held on Thursday, June 19, from 3 until 6:30 o'clock.

PUBLICATIONS OF INTEREST

AMPHIBIANS OF WESTERN NORTH AMERICA. By Robert C. Stebbins. Pp. xviii + 539, 64 pls., 35 text-figs. Published by University of California Press, Berkeley and Los Angeles, California, 1951. Price $7.50.

As a group, the amphibians have received less attention from past students of classification and natural history than the other vertebrate animals. Dr. Robert C. Stebbins, Curator of Herpetology at the University of California's Museum of Vertebrate Zoology, is one of an increasing number of specialists who are rapidly remedying this situation. The "Amphibians of Western North America" is a carefully written, attractively illustrated and fully documented account of all of the known species and subspecies of amphibians in western North America. The area covered by this work is "bounded on the south by the Mexican border, and on the east by the eastern boundaries of New Mexico, Colorado, Wyoming, Montana, and Saskatchewan and Mackenzie, Canada."

Keys are presented for the identification of adults, eggs, and larvae. The illustrations, all prepared by the author, depict the adults of each species and a few subspecies, many larval forms, the morphological features used in the keys, the geographic distribution of each form on a spot map, and photographs of representative habitats. Dr. Stebbins is the unusual combination of observant field naturalist, trained museum worker and skilled illustrator. The book profits handsomely from this combination of training and talents. – J.A.O.

ZOOLOGY IN POSTAGE STAMPS. By W. Dennis Way and O. D. Standen. 32 plates showing nearly 300 stamps in black and white. Philosophical Library, Inc., New York, 1952. $5.00.

Zoologists in general, it may be supposed, are less aware than philatelists that animals of all groups have often been figured, sometimes very beautifully, on the postage stamps of many countries. This little book is offered as a bridge between two interests which, while seemingly far apart, still have many points in common. There is real beauty in the "Pro Juventute" series of Switzerland and in the fishes of the 1951 issue of Mozambique.

Since the book is primarily philatelic, some major slips in zoological identities are to be expected. The "raccoon" of the Canal Zone is a coati, "gamecock" is a slip for the blackcock figured by Lichtenstein and the "Japanese fighting fish" are a very creditable pair of veil-tailed goldfish. But these small matters will detract little from the pleasure this book will give to many. – L.S.C.

New Members of the New York Zoological Society

(Between March 1 and April 30, 1952)

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Joel S. Mitchell, Jr.

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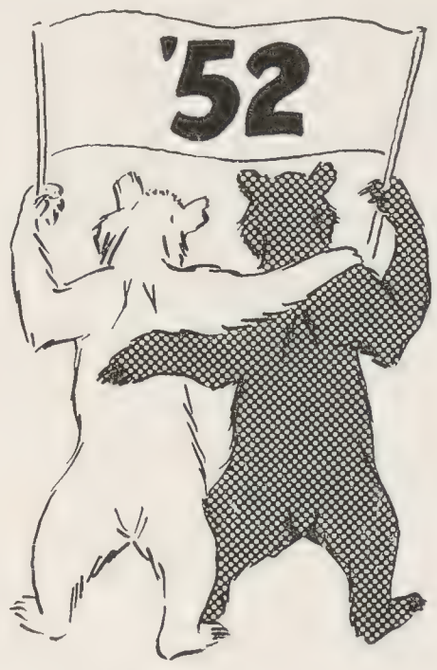

ZOO REUNION 1952

ALL THE REUNIONS this June do not center around Nassau Hall, Morey's — or comparable sacrosanct spots!

One of the gayest takes place at the New York Zoological Park (Bronx Zoo) on June 19, 1952 at 3 o'clock in the afternoon.

This is a *different* kind of Reunion! Here the animals meet the Society members and the members meet the animals. Not only are old bonds strengthened but new ones are formed. Herbert the Walrus for instance (with us only since last fall) is the current threat as the Animal-Most-Likely-to-Succeed!

This is the time we like to make NEW friends

We hope *all* our members can come to the Park for the Animal Garden Party, June 19th — BUT, we also hope each one will bring a prospective member, someone who will enjoy the afternoon, and want to come again for many years ahead.

Please BRING A GUEST who might become interested in the Society's work — and *be sure* to let us have his or her name and address so that we may pursue him or her!

Just send the names to:

MEMBERSHIP COMMITTEE
New York Zoological Society
30 East 40th Street
New York 16, New York

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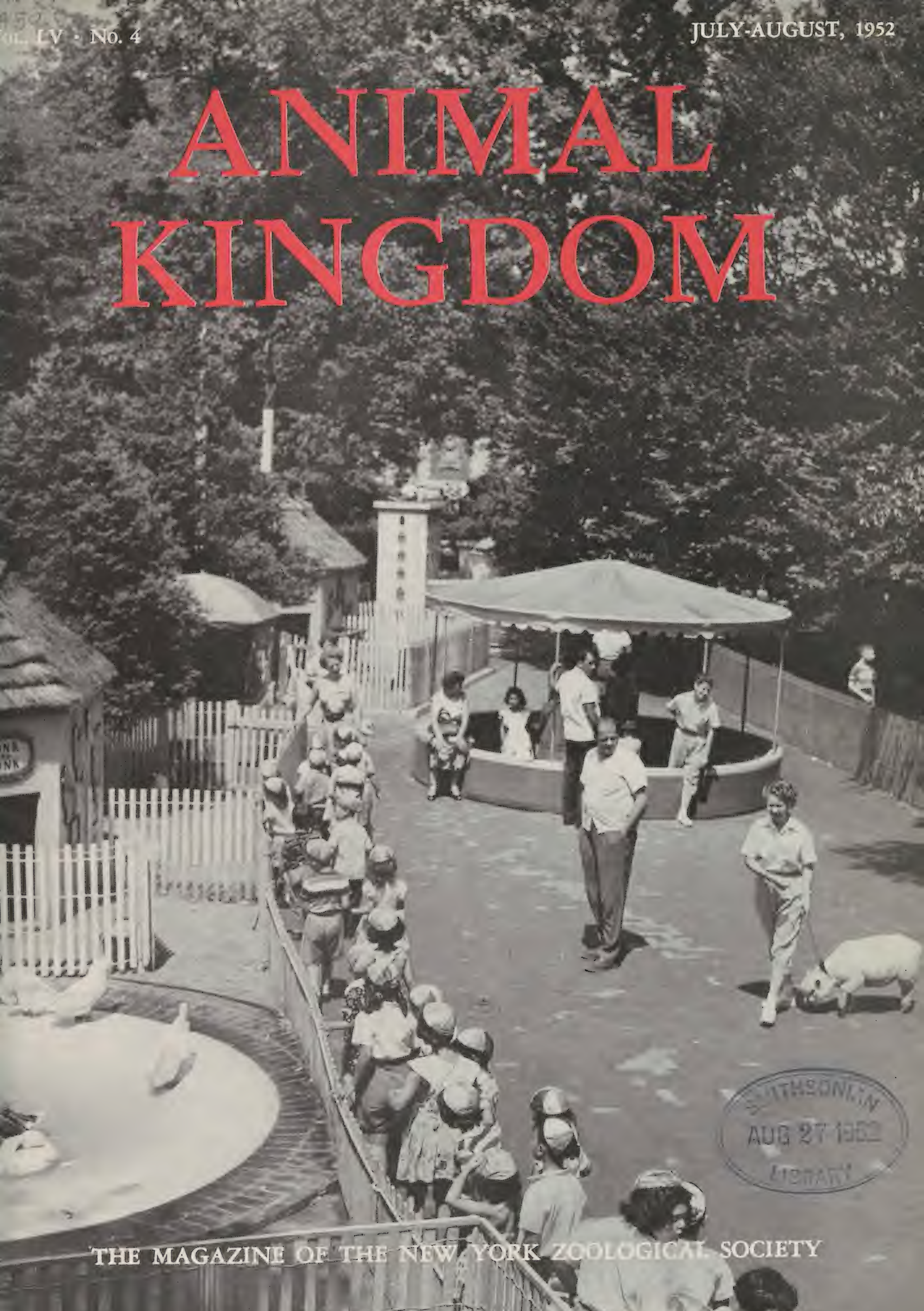
ANIMAL KINGDOM



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ANIMAL KINGDOM

Bulletin of the New York Zoological Society

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Time Zoologic

IN THE MEASURE of geologic time, 140 years is inconsequential. In human affairs, such years can create mountains of accomplishment, indeed *new worlds,* out of nothingness.

The announcement that appears on another page speaks of certain changes in our scientific and administrative staff that are now going into effect. New responsibilities are falling upon those who have earned the right to carry them. The work of our Society goes on. Time and tide may wait for no man but the institution is beyond their influence.

In one sense these staff changes are "routine" but an extraordinary circumstance is involved related to the lives and work of three men – William Beebe, Lee Crandall and John Tee-Van. Together their years of service aggregate just ten years short of a century and a half. More extraordinary, however, is the fact that they are all still "young" – either in ideas, or in the quest for new knowledge, or in their attack on work still to be accomplished. Part of the secret is that all three "enlisted" when they were still youngsters – the first two being barely out of the teen-age, the last mentioned, barely in it.

This brief message expresses every known brand of good wish including warmest congratulations to all concerned, in which, surely, every member and friend of our Society joins. Geologic time is all right in its way but in some respects it just can't compete with what can happen in Time Zoologic!

Fairfield Osborn

AUG 11 1952

An Announcement to Our Members

By FAIRFIELD OSBORN

President of the New York Zoological Society

It is one of the happy circumstances of our institution that there has always been a high degree of continuity in its administrative staff. It is not extraordinary when one thinks about it a moment; the study and care of wild animals is an absorbing occupation, and those attracted to it are caught up in something that commands their life-time devotion.

However, the old saying, "time and tide wait for no man," still holds true and calls for changes as the years pass by. In one sense they are not real changes because the wonderful work of our Society keeps rolling along and new hands pick up the job that others through the years have been carrying forward. In this same spirit we all continue to be one, yet there is an undeniable wrench in breaking old and familiar ties. In this same spirit, too, it is a deep satisfaction to announce that through action of the Executive Committee of the Board of Trustees of the Society, the following changes of title and duties of the staff of the Zoological Park and the Department of Tropical Research are now being put into effect.

As of July 1, John Tee-Van has moved from the position of Executive Secretary to that of Director of the New York Zoological Park.

As of July 29, Dr. William Beebe became Director Emeritus of our Department of Tropical Research.

As of July 31, Lee S. Crandall became General Curator Emeritus.

Other administrative changes have also been made and new duties and new responsibilities devolve upon certain members of our staff.

Dr. Leonard J. Goss, our Veterinarian since 1939, will also become Assistant Director.

Miss Jocelyn Crane, a member of the Department of Tropical Research staff since 1930 and its research zoologist since 1942, has been made Assistant Director of this Department.

Robert M. McClung, who has been Assistant Curator of Mammals and Birds since 1949, has been named Acting Curator of the Department.

Miss Grace Davall, assistant to the General Curator, will become Assistant Curator of the Department of Mammals and Birds.

Herbert J. Knobloch, associate in charge of the Education Department, has been made Assistant Curator of the Department.

Gordon Cuyler, formerly assistant to the Executive Secretary, now holds the position of Administrative Assistant.

Dr. John V. Quaranta has been appointed Research Associate in Animal Behavior.

Among the employees of the Zoological Park, seventeen have reached the age of retirement from active duty. While a majority of these are men and women who came to us comparatively late, during the Second World War, special mention should be made here of two animal keepers and a fish collector on the staff of the Aquarium who are well-known to many of our members. George Kress, Keeper of the Antelope House, came to us in 1909. James Rimmer, Keeper of the Kangaroo House, has been in our service since 1926. Frank Fitzgerald of the Aquarium staff came in 1927. Mention should be made, too, of Nicholas Raduazzo, one of our plumbers, who has helped keep the Zoological Park in func-

tioning condition since 1908, and John Atkinson, fireman, who came in 1923.

All of these, as well as the men and women of fewer years of service (they came to us between 1939 and 1946), have earned the gratitude and best wishes of all of us, for, as it is so well said on the certificate presented to our employees on their retirement, "All who have shared our daily task . . . may take pride in knowing that they have left a considerable part of themselves in the fabric of our achievement."

Because the changes in our administrative staff involve principally a realignment of duties, no special introduction of our official family to our membership is necessary. John Tee-Van, because of his extensive scientific and administrative experience, is ideally qualified to take on the position of Director of the Zoological Park. Among other things, Mr. Tee-Van now assumes the mantle so long held by Dr. Beebe as "the oldest living inhabitant of the Zoo" – although he always had a close runner-up in the person of Lee Crandall, who came in 1908. Director Tee-Van became assistant keeper in the bird department in 1911 at the age of fourteen, and thus has been on our staff for forty-one years. After five years in the Bird Department he became an assistant in the newly formed Department of Tropical Research and worked alongside Dr. Beebe in many tropical research stations. Since 1942 he has carried the responsibilities of Executive Secretary of the Zoological Park.

Some of our members may perhaps not be fully aware of the scientific work of Miss Jocelyn Crane, the new Assistant Director of the Department of Tropical Research, which has gained for her a notable position among specialists in her field of ecology and behavior, particularly of invertebrates. She has been a member of scientific expeditions to Kurdistan, Bermuda, British Guiana, the West Indies, off the coast of Lower California, the west coast of Central America, Venezuela and Trinidad. She is a graduate of Smith College, which gave her an honorary degree of Master of Science in 1947, and is a Fellow of the New York Zoological Society.

Mr. McClung, our new Acting Curator of Mammals and Birds, may be called a "career man" in the field of zoology. He is a graduate of Princeton and during the Second World War was a Lieutenant Commander in the Navy as a Landing Signal Officer aboard an aircraft carrier. In 1948 he earned a degree of Master of Science in zoology at Cornell University. During the past four years, three of them as Assistant Curator, he has been engaged in the practical aspects of zoo-keeping under Lee Crandall.

It is especially gratifying to be able to report of our new Director Emeritus of Tropical Research and General Curator Emeritus that their abilities and experience will not be lost to us. Dr. Beebe will actively continue research projects in the tropical valley of Arima, in Trinidad, at the Department's field station at "Simla," for the establishment of which he is, in fact, responsible, at the same time spending a considerable part of each year at his laboratory in the Zoological Park. Through another auspicious arrangement, Mr. Crandall will now commence, at an office in the Zoological Park, the writing of a series of books on the care, feeding, breeding, maintenance and exhibition of wild animals in captivity. There is at present an extraordinary lack of such literature both here and abroad.

Welcome to the Zoo

Rarities Are Fewer but Still Important

By LEE S. CRANDALL

Sometimes the camera is astonishingly revealing. This delightful photograph by Arthur Sasse of International News Photos caught Dacca's four cubs just at the moment their four temperaments were perfectly revealed by their expressions: Left to Right: Sira, the alert cub; Gingi, always lazy; Wadi, irascible; Souja, sweet.

TIME was when new specimens arriving at the Zoo, unless their importance was really outstanding, were reported merely in notes in ANIMAL KINGDOM, or not at all. In older days the market teemed with material so that we were able to select what we liked and to pick and choose from the weekly lists of innumerable dealers. New arrivals were our life-blood then.

Nowadays our course seeks other channels. A changing world is reflected in our concepts, which must keep abreast of conditions as we find them. Constantly increasing local restrictions, largely designed to protect threatened species, regulations of our own authorities enforced to prevent the introduction of disease that might endanger our livestock industries, and the ever-mounting costs of overseas transportation are the factors

that have brought about the change in our basic policy.

We now depend largely on the breeding of available species, so that we may exchange with others fortunate enough to possess stocks of desirable animals. When we find that the Chicago Zoological Park can send us a male Alpaca to replace the aging head of our small herd, we are very happy. When our Dacca's annual litter of Tiger cubs is old enough to be dispersed, other institutions are always glad of the opportunity to make replacements.

In the light of these changes it becomes obvious that the arrival of actual rarities from abroad is of great importance. Such things still come, on infrequent occasions, and when they do they are worth more than a short note in our magazine.

Following the loss of our Giant Panda in the autumn of 1951, we were faced with a dilemma. Because of political conditions in China, a new panda was out of the question. To find another animal or group of animals for which the specialized conditions of the Panda Moat would be suited seemed almost impossible. Finally we decided that Wolverines would be just the thing and began a quest that did not end until May 13 of this year, when four infants of the European form became available. These little animals, weighing only 6 to 8 pounds on arrival, increased so rapidly in size that we were able to transfer them to the moat a month later.

A little back-tracking brought a letter from C. af Enehjelm, director of the Zoological Garden at Helsinki. He wrote that the Wolverines came to him from the sub-Arctic in early spring, and had been carefully hand-reared before being sent to us. We knew that something of the kind must have happened, for the youngsters were obviously accustomed to human beings.

Our last previous young Wolverine was received in 1914, and general experience with the animal in this latitude has not been good. However, the present group — a male and three females — are so friendly, frolicsome and altogether

Friendly and playful from the firs the young Wolverines allowed them selves to be held by Hospital Attend ant Coder soon after they arrive Now each one is almost an arm-ful

Panchito, the baby Mountain Tapir, still had traces of his baby stripes when he came to us, but they are disappearing rapidly. The youngster is a little shy, but appears to be in excellent physical condition.

attractive that we hope to abolish, through them, another long-standing tradition of Wolverine difficulties.

Charles Cordier, now well established as a collector in his own right, continues to enhance the reputation as a gatherer of rarities that he established while he was working entirely in our interests. Stationed in Quito, Ecuador, since last autumn, the Cordiers were able to amass a superb collection which they brought to New York on June 19. During the winter we had been able to secure certain commitments, so that early in the morning we were at the airport and carried off two real prizes just in time for them to be viewed at the Members' Day party that afternoon.

One of these is a young male Mountain Tapir, named Panchito, the second of his species ever to be seen alive outside its Andean home. Panchito came from the eastern Andes of Ecuador at an elevation of about 11,000 feet, just above the village of Papallacta, the traditional source of such specimens of the Mountain Tapir as have previously reached museums. Charles Cordier believes that Panchito was born in September, 1951, as he was very small and carried the white-striped coat usual in young tapirs of all species. Still bearing faint, broad stripes of gray along his flanks, Panchito is otherwise similar in coloration and markings to Panchita, our now well-known female acquired in the autumn of 1950. To possess a living pair of Mountain Tapirs is certainly a privilege we had not anticipated and naturally we shall make every effort to take advantage of this happy situation.

The second object of our special interest is an actual "first": a Northern Giant Hummingbird (*Patagona gigas peruviana*). This bird was collected in the Andes, north of Quito, at an elevation of 7,000 feet. In the course of the years we have shown here a total of eighty-five kinds of hummingbirds but never, until now, were we

able to obtain this real giant. With a total length of 8½ inches and folded wings in excess of 5 inches in length, the bird looks little like a hummer, except in flight. Even then the broad wings move so slowly, with no hint of the blurring movement seen in lesser relatives, that they might almost be said to flap. As long ago as 1841 Charles Darwin, in the "Voyage of the Beagle," remarked upon this curious point. More than a hundred years have passed before we could confirm his observation by viewing a captive specimen.

The Giant Hummingbird, like so many outsized species, is hardly beautiful, with its loose plumage and dull coloration.

On the day after we claimed our two great rarities, we made further selections from Cordier's collection and found such dazzling beauties among the hummingbirds as the Comte de Paris' Star-frontlet, the Scissor-tailed Racket-tail, Parduzaki's Sun Angel, the Blue-headed Sapphire and the Shining Sunbeam. The dullest of these more than compensates for the comparative drabness of the giant.

There were others, of course, besides the hummers. A Bobwhite-sized bird, that might have been a quail or a rail, proved to be an Ocellated Tapaculo (*Acropternis orthonyx infuscata*), a member of the Rhynocryptidae, a family of pas-

The Red-mantled Marmoset from the lower reaches of the Napo River in Ecuador is well-described by its name. It is a species we have not exhibited before.

This is the Giant Hummingbird, the first specimen ever to be exhibited alive. An air-conditioning unit has been installed in the Jewel Room for the comfort of hummers from the Andes.

serine birds entirely new to us — or, for that matter, to captivity. A round-bodied black and brown bird of terrestrial habits, it deserves a more descriptive name, not yet devised.

Another stranger of special interest is the White-backed Dipper (*Cinclus leucocephalus leuconotus*). It represents another family new to our collection (Cinclidae). The dippers are noted for their curious habit of walking under water on stream beds, searching for the aquatic insects and larvae that form their food. With a broad distribution in the northern hemisphere, there is a deep extension which carries several species far down into the Andes of South America.

Since mammals and birds should have equal importance here, mention should be made of two marmosets. One is the Red-mantled (*Mystax lagonotus*), a black-and-chestnut species brought by Cordier from the lower reaches of the Napo River. This handsome little creature adds a new name to our growing marmoset collection. Last of all is an altogether charming little female Imperial Marmoset which arrived in a small Brazilian consignment. Intended as a mate for the male acquired last year, she still requires the devoted care of Helen Martini. But infantile though she may be, her curling white moustache is every bit as dashing as that of her future mate.

Once each month, while he is at the Department of Tropical Research station in Trinidad, Dr. Beebe mails a report on the department's activities — or, quite as often, of the activities of the birds and butterflies and four-legged beasts that are the familiars of the station.

The reports are essentially newsletters for the information of the Zoological Society's trustees and staff. We here offer extracts from recent ones, including part of Dr. Beebe's account of a journey he and Miss Jocelyn Crane of the department's staff made on the Pathfinder, of the Alcoa Line, from Trinidad to Moengo in Dutch Guiana or Surinam, at the end of April.

* * *

River Trip, with Orchids and a Caterpillar

By WILLIAM BEEBE

ALL DAY we steamed or were towed upstream, through an ever-changing panorama. First the swampy lowlands of mangrove and serried ranks of muckamucka. Next came rolling forest with palms, and finally primitive jungle. Now and then there came into view a giant of giants, a solid mass of purple flowers against the sky — a full-grown purpleheart.

Our scrawled lists form an inchoate kaleidoscope of wild-life — toucans singly, and parrots and parrakeets in twos or flocks, red and yellow-backed caciques, a solemn conclave of red-headed vultures sunning themselves and gazing down at us with appraising eyes. A great drake Muscovy Duck shot out of a side canyon and whistled across our bow, kites soared and a pair of Bat Falcons perched like mirror images of our Rancho Grande birds. Emerald-shot urania moths and blinding blue preponids flew over the deck. Finally came a sudden glimpse of a White Morpho. To our eyes it was the same mother-of-pearl ghost which we captured three thousand miles to the northwest and sixteen years ago, at Tenacatita, Mexico.

Along the lower reaches of the river, wherever there is dry ground, are vestiges of ancient estates which long ago were operated in the grand manner. Usually the manor houses have gone completely, or show a few rotting, jungle-overgrown boards. When the last vestiges have gone and tangled growths have taken over, high in air there still stretch the lofty boles and terminal fronds of royal palms. These are always in two long rows and used to mark the approaching drives to the Groete Huis of the estate. Elsewhere it is the songs of House Wrens which mark the site of former human habitations. Here it is palms.

Just before nine o'clock our vessel nosed sluggishly around a sharp bend and we forgot our naturalistic survey. What we saw might as well have been a herd of wild elephants bathing in the muddy stream. Instead, we were passing within a few feet of an African village. The setting was as incongruous as the Dahomey village at the World's Fair. Only this was the real thing. The Djukas, living in single huts or in small villages, are descendants of the runaway slaves who took to the jungle many years ago and successfully established themselves along the rivers of Surinam. These African-born slaves had not forgotten their former way of life, as witness their beehive huts, dug-outs, bows and arrows, braided wool, cicatriced skin patterns, and especially their wholly adequate suitings, comprising a G-string or a bead apron.

As we looked ahead of the vessel, the muddy water along the shore is quiet, without a ripple or lap, but as the wash from our bow reaches shore, turmoil ensues. Quiescent sticks become wriggling anacondas, stranded logs detach themselves and take to themselves crocodilian activity. Muckamucka wave their banners furiously and dip their heart-shaped flags to us. The Djuka village is quiet and calm as we approach. The ebony figures stop their occupations to watch the great vessel pass almost within reach. Mothers

An improbable but very tangible scene on a river of surprises — a Djuka village hemmed in by jungle. The village folk are descendants of runaway slaves, and have retained their ancient African ways of living.

with nursing babies, little girls carrying their still smaller brothers astride their hips cease to wash the infants in the flood of turgid mud. Others stop pounding cassava, while still others, engaged just in squatting, waiting for time to approach and pass, these do not even turn their heads.

Alcoa ships pass 25 times each month, yet the first wash seems always to take the Djukas by surprise. Wading infants splash toward shore, stumbling into the boiling shallows. Mothers rush up the bank to avoid the oncoming bore, a dog absorbed in frantic search for a Surinam flea is overwhelmed, lets out a yelp and swallows a mouthful of mud. The men and boys in the flock of canoes are more prepared and paddle frantically toward the vessel, riding the waves bow on. This enables them to avoid the littoral maelstrom. The most unlucky are those owners of canoes who have left them partly ashore or tied to a stick. The sudden breakers sweep the loose boats down stream and overturn the others, strewing their pitiful contents, and bringing a horde of black figures from the huts, many, in their haste to salvage their belongings, quite G-stringless. I saw no signs of anger at the catastrophe; only amusement at one another's predicament in what must have been a familiar crisis.

On and on we went up the ever-contracting

Going up-river in Surinam is a tricky business, for the river is narrow and often the boat is crowded against the jungle bank.

Suddenly, in the forest outside Moengo, they came upon a native Djuka with an ancient gun and a toucan he had killed for dinner.

river, until the branches almost touched us on each side. Then we nosed into a fifteen-foot backwater and a powerful tug tied up to our stern and for six miles towed us backward, with an anchor trailing from our "aft bow" through the mud, to keep us steady. In such fashion we reached Moengo, the port of the bauxite mines. Spread out around us were acres upon acres of mining paraphernalia and pleasant homes and all the comforts which careful planning can bring to pass in the very heart of the wilderness. Even before we went ashore, huge funnels began pouring great streams of bauxite into our open holds.

We drove fifteen miles along the single road which ended at the French Guiana border. We saw the mines which cover wide expanses of cleared jungle, crisscrossed by diminutive railways, chugging back and forth with unending carloads of the precious, frangible mineral. Then on along a jungle road, and short excursions into

the various forest zones, collecting samples of our particular precious creatures. These, unlike the bauxite, are of no use to man, contributing only knowledge for knowledge's sake.

Moengo is a place of contrasts. One which remains in memory was a Djuka who appeared suddenly along a jungle trail, close to a pile of bauxite. The destiny of the pink dust may well be a supersonic plane; the Djuka was dignified, black, naked and unashamed. In one hand he held an ancient fowling piece, in the other a just-killed toucan.

The power of sound was well shown by the call of a single bird, as we were leaving the forest. It had three syllables, of a remarkably loud and piercing quality – Whee-WHEE-O! It was a Goldbird, here, more appropriately a Bauxitebird. To the many sharers in the eight years of the Department's expeditions in British Guiana, the song of the Goldbird forever typifies the heart of the deep tropical jungle.

The climax of this strange and altogether delightful trip was the happenings on deck. In spite of two skillful pilots and the strenuous efforts of a pair of tugs, nothing could prevent occasional bumps against the banks of this tortuous stream. The first of such occurrences showed their value to us. The top of a small tree brushed against a life-boat, snapped off and covered the upper deck with twigs, leaves, blossoms, ants and a varied assortment of crawling creatures. We blocked a member of the crew who was about to sweep up the debris, and we began ourselves to search it and glean nuggets of scientific worth. This re-occurred on both up and down trips and we salvaged strange jungle katydids, beetles and orchids. At one place the stern was jammed far into the forest's edge and enabled Jocelyn to photograph a rare air-plant in full bloom, high above the forest floor.

On the very last of these fortunate mishaps a weird caterpillar was flicked off and instantly captured. We had never seen anything like it and we had presence of mind to save several twigfuls of leaves, which proved to be the right food. For the ensuing two weeks at Simla we kept the leaves moistened and in the refrigerator, and doled them out one by one to the long-suffering larva. When the supply was exhausted we shifted

As the boat was crowded against the bank, this queer caterpillar fell on the deck and was rescued, fed, and carried back to Simla.

to Erythrina which was accepted with reluctance. Whenever, after this, we met fellow shipmates at cocktails or elsewhere, the first question was "How is the caterpillar?" The end is not yet.

We suggested a new slogan: "Travel with Alcoa and pick orchids off the deck." Seldom in my life have I had so many new and memorable experiences packed into five days. Moengo, thanks to Alcoa, would afford a season of perfect opportunities of research for visiting scientists from the Zoological Society's station at Simla.

* * *

At Simla, the first hint of hair-trigger change geared to the onset of rain has happened. The evening after the seven-tenths of an inch of rain on April 27, there occurred an invasion of uncounted myriads of black ants. This is a common sight during the tropical rains, but the present instance was the first of this year.

The ants were not more than a quarter of an inch in length but their combined mass would have filled barrels. They came in such dense hordes that everyone was driven from the laboratory, and it was necessary to turn off all the lights. Kitchen, food, bedrooms and compound were all inundated. Hundreds of thousands of ants, all of the same species, were liberated at the first touch of falling moisture. Swifts, swallows, bats and every form of insect-eating creature must have gorged to repletion as long as the flight continued. The following day only a few ants were visible, and the Earth was again safe for man. Some subtle form of natural selection had operated and the balance of jungle life was restored. It is almost frightening to think of the millions of invisible lives, still waiting for vivification.

* * *

At 10 in the morning of March 16th, a female Mango Hummingbird whirred through the open double doors into the laboratory and at once flew upward and began circling in the lofty area of the rafters. The end could be prophesied from a number of similar occurrences. Three other species usually blunder down and out of the door again, but Mangos seem to be controlled by some instinct which compels them to keep near the roof peak. Here they alternately fly and perch until exhaustion brings them to the floor, usually too late to resuscitate them. The alternative is to manipulate a twenty-foot bamboo pole, which reaches nearly to the roof peak, and which will keep the unfortunate bird in a state of constant flight. With luck, one of three other persons armed with butterfly nets can ultimately catch the hummer, carry it outside and liberate it.

Two of us were alone in the lab on the present occasion, the others having gone caving, so we let nature take its course, glancing up now and then at the pitiful pinch of feathers. After twenty minutes the bird slithered down the wall, its wingbeats slowing up as its strength waned. This happened three times and not until then did we realize that it always reached a certain spot and hovered there. This proved to be on a large Vegetation map of Trinidad. Putting aside the thought that the hummer might be seeking a way out of the lab we were interested to note that the hovering was constantly at the northwest area of a Mora Forest. Then we realized that it was the color – brilliant scarlet, indicating this type of jungle – which drew the bird. Again and again it fluttered down to the same spot, and vainly pecked at it.

It then flew to a cluster of golden Queen of Sheba seed cases. Then up again into the dim rafters. I rushed to the dining room and brought out the center-piece of wild, scarlet cacao lilies and placed them on the floor, close to the door. Instantly the poor bird wavered down, landed with a flop, and began eagerly to probe the blossoms she could reach. A few weak flutters shifted her to another group of blooms from which she sucked the nectar. All fear had gone and with her last efforts she strove to recover her energy, to quench her thirst and her hunger with the liquid. It was a vivid example of the extremely rapid metabolism which characterizes these small birds, the swift digestion and the necessity for equally rapid replacement of energy. After several minutes the Mango flew out of the door and alighted or rather fell, breast first, on a cluster of scarlet ixora blooms, and for the next ten minutes she flopped and flew from bunch to bunch. Finally she rose, looked about and took off on strong wings toward the valley below.

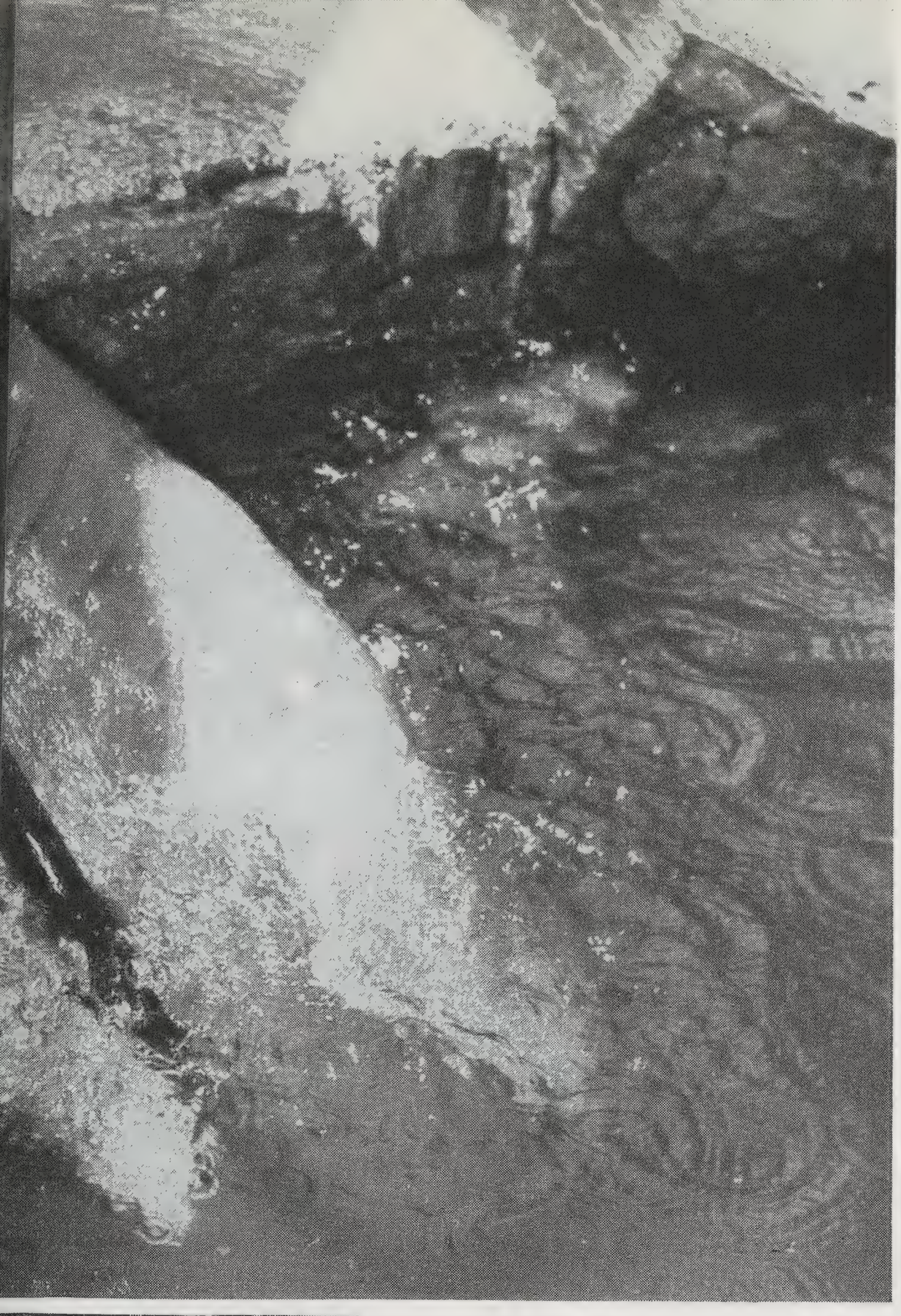
Attraction, even in extremis, was very evident to what, to our eyes, is red, whether painted Mora Forest or actual lilies and ixora.

Taking tub baths on hot days is the favorite occupation of our Grizzly Bear cub, a recent gift from Yellowstone National Park.

HOT TIME in the Zoo

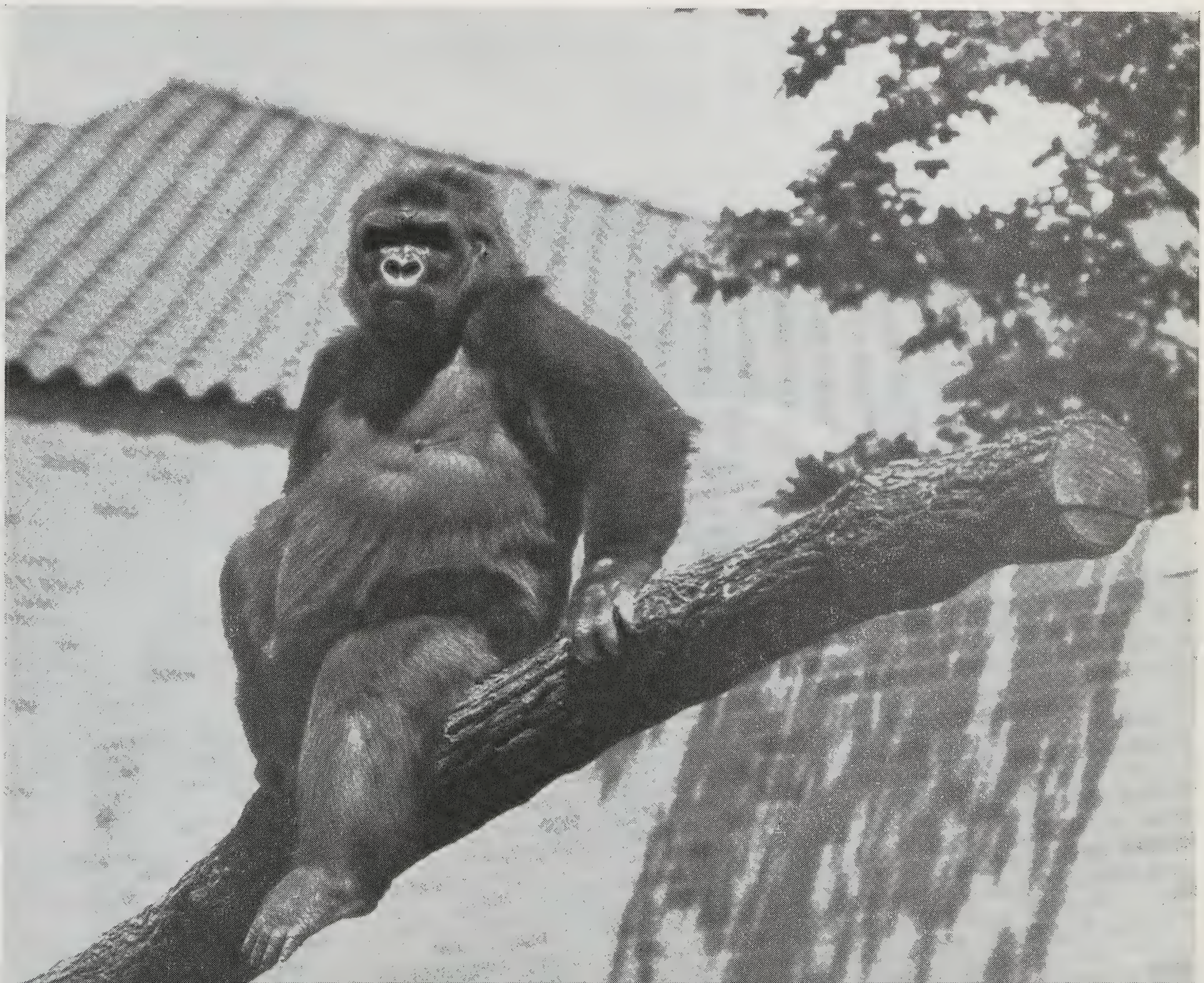
Photographs by SAM DUNTON

Hot weather is a joy to our Elephants now, for they have a bathtub all their own. Sudana, the big African, usually starts the fun by pushing her companions into the pool. Then she sprays water behind her ears.



The latest trick of our engaging baby Walrus, Herbert, is to play with a hose, holding it so the water sprays on his head. He can even swim on his back and hold the hose in his flippers while taking a refreshing showerbath.

Sun-bathing from her favorite perch on a tree trunk in her enclosure at the Great Apes House is Oka's way of enjoying summer-time—for Gorillas have no liking for water. In the heat of the day she seeks a shady spot.



THE ATLANTIC GRAY SEAL

By F. FRASER DARLING

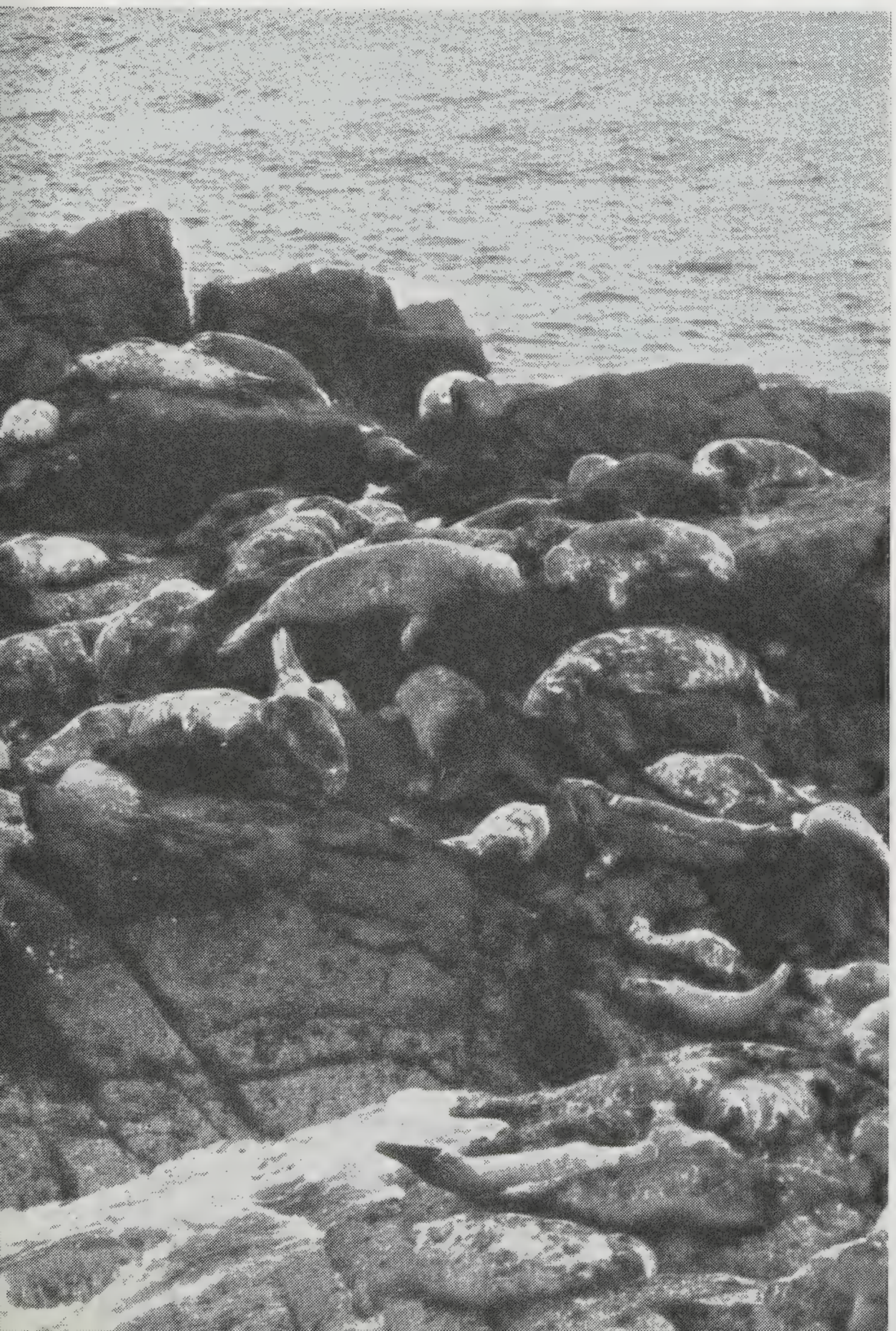
All photographs copyright by the author.

It is rather strange that the life history of a large mammal found on both sides of the North Atlantic Ocean should not have been known with accuracy until recent years. Indeed, there are still plenty of problems awaiting solution by naturalists if they wish to concentrate on this fine animal, the Atlantic Gray Seal. Here is one of the rarer seals of the world but for once it is truthful to say that the species is increasing fairly rapidly after having been reduced to very small numbers.

The Atlantic seal inhabits the cool, temperate coastal waters of the North Atlantic and is most numerous off the west coasts of the British Isles. Some are to be found on the outer Norwegian coast and, strangely enough, there is a colony isolated in the Baltic Sea. This seal is also to be found round Iceland in small numbers, and then there are colonies in the Gulf of St. Lawrence and one in the Bay of Fundy. Occasional specimens come south into United States waters, and others have gone north on the Labrador coast and even as far as southern Greenland, where the Eskimos formerly greatly prized the skin of this large, rare seal for their summer-hut making. The United Kingdom and Irish stocks, which are increasing, have doubtless budded off the colony which has recently been found around the northwesterly peninsula of France.

The Atlantic Gray Seal is found most abundantly on tiny North Rona, Britain's loneliest isle.

Atlantic Gray Seals basking on the Skerries at the north end of Fianuis, North Rona Island.



What may be called the headquarters of the species, or at least where more are found than anywhere else, is the tiny, 300-acre island of North Rona, Britain's loneliest island as it is sometimes called, fifty miles northwest of Cape Wrath, the northwesterly tip of Scotland. This island is rockbound, without any beaches, and in a stormy part of the Atlantic where a deep swell is normal. So the seals have pretty good sanctuary. I have had the good fortune to watch the Atlantic seal on several West Highland Scottish nurseries and have spent several months encamped on this remote islet of North Rona.

The Atlantic seal is the biggest of the northern pinnipeds except for the great Mexican Sea Elephant. Bulls of the Atlantic seal reach a length of nine or ten feet and cows are about six feet long. There is a considerable difference in appearance between the bulls and cows: one of the characteristics of the species is the long face and Roman nose, but in the bull this is very marked indeed and once seen there is no fear of mistaking him for any other species. His color is olive brown with a certain amount of shadow-mottling on the body and some flecking of white under the throat and chest. Some bulls are jet black and occasionally a uniformly light gray one is seen. All of them have a steel gray cap which is the origin of the name Gray Seal, but this cap is not obvious unless the animal has been out of water some time and its coat has dried.

The cows are exceptionally beautiful. From nose to tail on the upper or dorsal surface they are blue-gray in color, but the skin itself (not the hair) is dappled with black which shows through the light coat. The under side is basically white, heavily splashed with black, and I once saw a cow with chestnut shadings on the throat, still with the black splashings. There are also jet black cows and some mole-colored ones.

As one gets accustomed to the several island stocks it is possible to recognize predominant colorings peculiar to each; for example, the St. Kilda stock is very dark, and the bulls from the Shetland Islands display a ringed pattern, like a succession of necklaces, on the throat and chest.

Atlantic seals keep mainly to the outer rougher coasts, feeding on Rock Fish, and Conger Eels when they can get them. It is something of a spectacle to see a bull seal managing a six-foot conger. All told, these seals do not much interfere with commercial fisheries and are to some extent beneficial to them because the seals feed on predatory fish. Some years ago I was asked to investigate seal damage to salmon fisheries in the River Tweed which bounds Scotland from England and flows into the North Sea. The only colony of Atlantic seals on the east side of Britain is on the Farne Islands, a few miles south of the Tweed. There has been a great increase in the stock and there is no doubt that here they found a concentration of salmon near to their home ground, and they were doing considerable damage. It is a good thing for the species, now protected by law from August to December, that this is an isolated example of positive damage.

The most important factor influencing this seal's life history occurs before it is born. The common Harbor Seal (*Phoca vitulina*) sheds its birth coat before it is born and is thus able to follow its mother to sea on the day of its birth. But *Halichoerus grypus* is born with a thick, woolly white coat not suited for free swimming in the sea. Some natural history books say that the Gray Seal calf cannot swim at first and has to be taught by the mother. This is quite wrong; the little seal can swim quite well from its first day, but just as if we went swimming fully clothed, it would soon be exhausted. I have found several drowned from accidental immersion and inability to get ashore within an hour, though at a nursery island where there are a few quiet pools of fresh or brackish water, the baby seal will play happily in them.

Of course, the Atlantic seal is not alone in being born in a long birth coat which must be

A bull with his harem. The cow he is courting has just slapped the water with her flipper and is crying to him.

The calf, in its woolly white coat, has just been fed and its mother is turning to fondle it.

A bull and a cow Atlantic Gray Seal bob up alongside the boat for a long, inquisitive stare.

shed before going to sea, but most other species showing this characteristic, such as the Harp and the Hood, are ice seals which have their young on floes. The Atlantic seal occupies temperate waters so the calves are produced on dry land, mostly on remote islands, and sometimes on the beaches of mainland caves. This, then, is where the Atlantic seal is exposed to great danger from predation by man. In the days when sea boots were made of leather and the cruisie-lamp was burning seal oil, there were annual raids made on the seal islands at the breeding time to kill old and young indiscriminately. It was frightfully cruel and wasteful exploitation, and we may be thankful for the advent of rubber boots and kerosene oil which have together

lifted the pressure off the seals. Then the protective legislation gave them complete freedom to recover in numbers.

Atlantic seals are not markedly migratory like the Pribilof Fur Seals, and the Harps and Hoods of the Polar Current on the eastern side of North America. Yet there is the definite gathering of the seals at the breeding islands and their diffusion again after breeding and changing their coat. The watcher on North Rona sees the seals increase in numbers during July and August. More are to be seen playing in the sea, more are hauled out on isolated rocks or skerries to bask in the sun.

The first seals to come ashore are the big bulls, towards the end of August. How magnificent they are in their strength, fat and sleek, weighing nearly half a ton! These big fellows take up territories on shore quite quietly and without fuss. There they lie, preferably in a puddle of water, scarcely moving except to turn over. They cease to feed when they emerge from the sea and will catch no more food till they return some weeks hence.

The cows come ashore early in September and they also lie quiet in the territories of the bulls, who take little or no notice of them. Perhaps a cow will be ashore two days before she calves, and as soon as several cows have calves there is likely to be pandemonium. These cows are the most jealous and fussy mothers imaginable. And the situation is made worse by the newly born calves until their second day, for at this age they scramble about the nurseries and get in the way of other cows. Their mothers come dashing across and there is endless bickering and quarreling between the cows. Curiously enough, also, the very young calves use their hind feet to get around and flap them alternately like a land animal. This habit disappears by the second or third day of life, when the calf lies quiet in its place and never uses its hind feet again for terrestrial progression.

The cows are also very fat when they come ashore and they also must starve till they return to the sea. So not only is the mother seal maintaining herself without food but she is giving a good quantity of rich milk to feed the calf as well. An average weight for a calf at birth is 30 pounds and when it is weaned at 14 days old, the weight is about 84 pounds. This means a liveweight increase of 4 pounds a day, and the milk contains 45 per cent. of fat. From being skinny little things at birth they become shaped like a large oval football at a fortnight.

The cows mate with the bull again 11-14 days after the birth of the calf, and the watcher now sees the structure of the territorial life of these seals. A bull's territory may be a tenth of an acre to a quarter of an acre in extent, and he will defend those boundaries; but he will make no attempt to *gather* cows into his ground. If they are in his territory they are his; if they pass his bounds they are his no longer. Fights between bulls are rare, though there is a good deal of challenging behavior most interesting to watch.

I said the calves were weaned at a fortnight old; more than that, they are completely deserted by the mothers who go back to sea and to one of the outlying rocks, to haul out and gradually rub themselves free of their old coat. They are very thin by the time they go back to sea to feed. The calves, meantime, are now changing their white birth coat, shuffling and rubbing to wear it off, though they spend long hours asleep. This change of coat takes a fortnight to a month to accomplish and during this time they are living on the fat accumulated in that first fortnight of life. When they do go to sea, they have to learn to feed themselves, and to begin with, molluscs and crustacea are all they get. It will be realized that this life history gives the young Atlantic seal no sense of tradition by way of a prolonged parental association, such as the common Harbor Seal gains. The observer of both species finds, indeed, that the little Harbor Seal has a much livelier intelligence generally.

We see that enforced association with the land places this seal in special need of conservation measures. But the rapid increase in western and northern Scottish waters has built up a stock which might now properly be looked upon as a potential wildlife resource. Colonization of new places should be easy — and zoo specimens should be obtained the same way — by moving the young ones at between two weeks and a month old, when they are starving anyway and have no tradition of the sea and of their home ground. No cruelty would then be involved.

Paradox Pond Revisited

By WILLIAM BRIDGES

ONE DARK NIGHT eighteen years ago I was taken, rather unwillingly, to a small pond on the east coast of Trinidad and bidden to be impressed, because this and another cow-pasture pond or two were the only known habitats in Trinidad of the famous Paradox Frog, *Pseudis paradoxus*, "the frog that grows by shrinking."

I was duly impressed – at least, enough impressed to make Paradox Pond the subject of an article in a series I was writing for the New York *Sun* about the late Dr. Raymond L. Ditmars's attempts to capture a Bushmaster in Trinidad – but the major recollection I retain of that night was of the big Marine Toads* that abounded on the margins of the pond. They were everywhere. Every yard or two a brown warty toad the size of a man's hand was sitting on the caked mud and never moving a muscle until you turned a flashlight on him. Then sometimes he would squat and hug the earth. You could pick up Marine Toads as fast as you could bend over, grab and pop them in the bag. They didn't even struggle, beyond a feeble kick or two, and all they ever said about anything was an unmusical "Skwaaank."

The professional collector of the party was Arthur Greenhall, Dr. Ditmars's field assistant, and he had an unhappy hour battling the deep and filthy muck of the pond. He wanted specimens of the ten-inch tadpoles that are the paradox (they shrink progressively until the metamorphosis translates them into two-inch frogs) but he floundered and cast his net in vain. All he got was four young adults.

On the other hand, I had a wonderful time. To save the evening from complete disaster, I concentrated on Marine Toads and loaded a sugar sack with fifteen pounds of the biggest and choicest. The very smallest was considerably larger than the biggest toads I had ever seen in the United States, and it was quite a blow, therefore, when Arthur refused to look at them. He said these were nothing – over in British Guiana (where we were to continue our snake hunting the next week) we would find Marine Toads as big as a bucket. So I turned them loose in the yard of the plantation house where we were staying, and the owner stepped on a couple in the dark and was annoyed, and eventually I had to pick them up again and take them back to Paradox Pond.

(Incidentally, in British Guiana we *did* find plenty of Marine Toads, but none as big as a bucket, and I distinctly recall one Paradox Pond specimen that was bigger than anything we saw in B.G. So there!).

I would like to think that when I revisited Paradox Pond this spring, almost exactly eighteen years after that first visit, I was a legendary figure to the Marine Toads that still abounded on the mud flats. If it weren't unthinkably anthropomorphic, I would like to think that a story has been passed down through successive generations of *Bufo marinus* of a Monster in Human Form that grabbed great-great-great-etc.-grandmother one night and carried her away, and unaccountably carried her back the next night.

Well, if the toads missed their chance at legend-making eighteen years ago, they have a second chance now, for the Monster struck again on the night of April twenty-fifth – and this time the captives aren't coming back. By the time

* Our Reptile Department prefers to call them Giant Neotropical Toads. I like Marine Toad better. The scientific name is *Bufo marinus*.

this appears in print, they'll be guests of the Max Planck Institute in Vienna.

The occasion of my return visit to Paradox Pond was a double one. The Zoological Park's Reptile Department wanted tadpoles of *Pseudis paradoxus* for exhibition, or, failing tadpoles, three or four pairs of adults that might breed in the Zoo. The Max Planck Institute wanted *Bufo marinus* in fair numbers for certain behavior studies, and Miss Jocelyn Crane of the Society's Department of Tropical Research had promised that under the Society's "Point Four" program of aid to biological research in Europe, Marine Toads would be captured and sent from Trinidad.

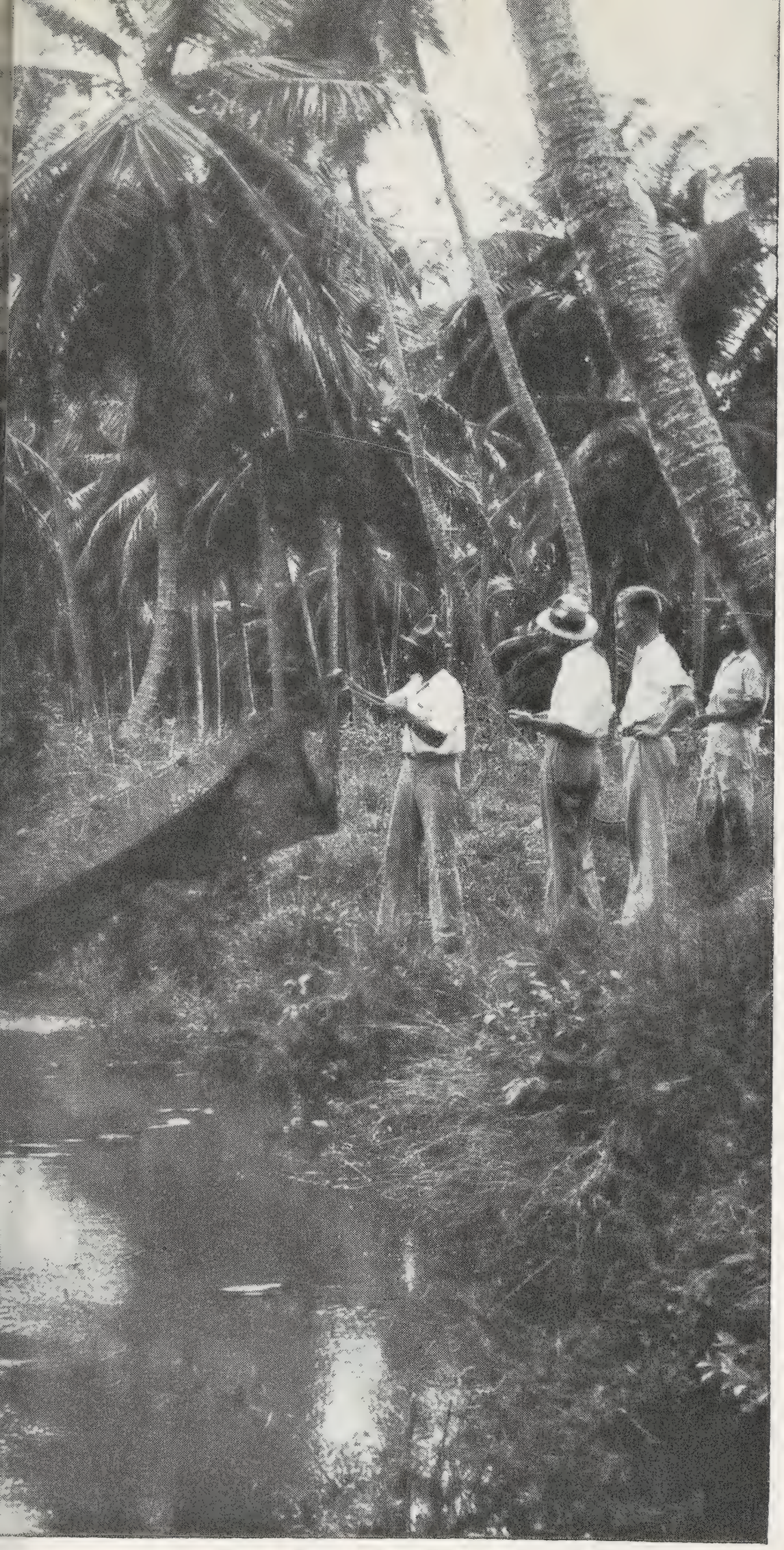
The raiding party consisted of Henry Fleming and Ellen Ordway of the Department of Tropical Research staff, and Edwin H. McConkey and myself. We looked to Mr. McConkey to capture the Paradox Frogs, for he is a professional herpetologist, accustomed to snatching agile and elusive fauna, and he owned the only pair of gum boots among us. The rest of us would look around for Marine Toads.

A forty-mile ride across Trinidad at night has its own quality and human interest. Arima, Maturita, Valencia, Guaico, Sangre Grande, Manzanilla, the towns and tiny villages with the singing names, were dimly awake in early evening. Light is a luxury along the Eastern Main Road, and a faint kerosene lamp or a flickering candle was the rule in the thatched huts or even the more pretentious tin-roofed houses; in the few spots where electricity was available, its blessings were not wasted under lampshades; a naked bulb dangling from the ceiling was the usual thing. Men, women, children and dogs relaxed in darkness, strolling at the edge of the road or lounging in the shadows beyond the light from a doorway. Dimmer still were the huts in open country and if they were not close-shuttered and black, a mere glow of light was all that was visible.

Eighteen years ago Prof. Urich, the last of the old-school Trinidad naturalists, had halted at Sangre Grande for a round of Morlay's rum floats. Morlay is long since dead and the glory hath departed from Sangre Grande as far as I am concerned. Its only claim to fame today is the umbrella-topped pink poui in front of the police station, from which hang two hundred and two tubular nests of the Yellow-backed Cornbird. There have been other changes; in the earlier day, the shortest and most spectacular route to Paradox Pond lay along the beach of Cocos Bay, a twelve-mile scimitar of white and shining sand with the blue Atlantic on one side and an endless sweep of coconut palms on the other. Some years ago a blacktop road, smooth and straight, was laid through the coconut plantations, and while it makes the Mayaro area accessible at all hours (you used to have to wait until the tide was out, in order to drive over the hard-packed sands), the tropical beauty has, like Morlay, departed. Still, it must be pleasant by daylight, for the beach and the blue water would be seen a hundred yards away through the swaybacked coconut trunks; at night, it was merely eerie, noisy with the trade winds that tossed the palm fronds and the rushing waters on the beach.

The plantation that surrounds and encompasses Paradox Pond was for many years the property of the Urich family. Now, under the name of St. Bernard Estate, it belongs to Harriman & Sons, and a resident manager, Mr. Vincent Maingot, lives in the sprawling white house that the Urichs used for vacation visits. When he first came to Trinidad last September on a Fullbright Grant to study the herpetology of the island, Mr. McConkey obtained permission from the estate manager to visit and collect at any time, and thus we swept past the big house without stopping. Paradox Pond was closer than I remembered; a few hundred feet at most. Coconut palms half encircled it and gave way to a grove of lime trees thick-set with green fruit.

All of us carried electric torches or headlamps and our beams swept the pond in unison. It was a sight to make you gasp. Water lilies carpeted the black water and it seemed that every plant held up a white and immaculate, spiky blossom. The sedge or some other coarse water plants, the rubbish and dead gaunt branches that I remembered, were all gone and at our little height and distance the pond appeared a perfect, tidy circle not more than sixty feet in diameter. Black mud fringed it for a foot or two, then fifteen feet of hard-caked gray mud, and a six-foot bank rising to meet the coco palms. It was a lovely setting for the famous frog, and the pond itself was a paradox. How could it be so beautiful now, when once it had been so ugly? McConkey knew the



This is Paradox Pond as it looked a few years ago, before its bank was cleared.

answer. Some years ago, he said, the owner of the estate became interested in the Paradox Frog and gave orders that it was to be protected and preserved. The pond at that time was apparently very much as it had been when I first visited it: choked with grasses and water-weeds, storm-wrecked trees and general debris. The manager, not realizing that the rank growth made a perfect paradise for frogs, sent a gang of workmen who dragged and scraped and hauled until Paradox Pond was virtually limpid. That any *Pseudis paradoxus* survived the housecleaning is surprising. However, water lilies eventually appeared and as nearly as I could tell the frogs have come back in almost as great numbers as before. Mr. McConkey made a segment count and a rough estimate and figured there were fifty to seventy-five adults squatting on the lily pads within range of our lights. A few were calling, four or five, in a vague antiphon of shrill croaks.

Booted and ready for the mud, McConkey began a slow tour of the margin. There were plenty of adult Paradox Frogs; every dozen or so lily pads bore one; it was merely a matter of finding a frog within easy wading distance, for the mud was deep and sticky. Within two minutes our collector had his first frog and the next victim was in sight.

I claim the honor of capturing the first Marine Toad, a slight honor but a sentimental one. It was a quarter-grown *Bufo* of a size even I would have scorned eighteen years ago. This time our

Now, by night, the Paradox Pond is a thing of beauty, for its black surface is a field of water lily bloom.

The primary goal of the trip to Paradox Pond was this two-inch Paradox Frog, and in 25 minutes four pairs of adults were caught.

bag of Marine Toads was wanted by Science and even babies were welcome.

Ellen picked up Marine Toads, Henry grabbed them, I gathered them in with both hands. For five minutes we were as busy as children scrambling for pennies and it was only when the burlap bag grew onerously heavy that we became selective and deigned to stoop for none but two-thirds grown or better.

In twenty-five minutes McConkey acquired four pairs of Paradox Frogs (females have a taut white throat; males have a loose yellow throat) and had captured and released two or three unwanted females. That was the limit we had set for ourselves, since it was an adequate number to try experimental breeding in the Zoological Park. It would have been preferable to capture the six-inch tadpoles, for they could be put on exhibition immediately and their shrinking to adulthood watched, but that would have meant seining and serious disruption of the water lily growth. We were content with the adults.

We could have gone on picking up Marine Toads for the rest of the night. Trinidad has seldom had a dry season as dry as the present one and Paradox Pond, which has never been known to dry up completely, was a notable gathering place for a large section of the Marine Toad population of Mayaro. But enough was enough.

Science would be well served by the thirty-four we already had, and exactly thirty minutes after arrival at Paradox Pond, we stowed our bags in the back of the station wagon and slipped away.

On the way home McConkey told me that Paradox Pond no longer has the distinction of being the only spot in Trinidad where this curious frog is found. A few weeks ago he captured three *Pseudis* in a concrete cistern on the Perseverance Estate at Cedros, in the southwest corner of Trinidad. How they got there, whether there are more in that or other areas, he has no idea. There are no natural ponds in Cedros; in fact the two ponds at Mayaro (one goes dry in the dry season, but has Paradox Frogs in the rainy season) are the only natural ponds he knows on the whole island. He thinks, though, that if Trinidad were combed intensively for *Pseudis paradoxus,* they might be found elsewhere in at least small numbers. Oddly enough, they are much more widely spread in Venezuela, the only other part of the world in which they are found.

Marine Toads, on the other hand, while they are truly native only to the New World, have been carried by man to many other tropical parts of the world. Our thirty-four will never be missed in Trinidad. And capturing them for someone who *wants* them, and will appreciate them, was the final joy of Paradox Pond revisited.

And these are some of the Marine Toads that fully repaid a return visit to Paradox Pond. Dr. Oliver sent them to Vienna.

News from the Conservation Foundation

President Osborn Returns From Europe

PRESIDENT FAIRFIELD OSBORN, whose projected European trip was announced in the May-June issue of ANIMAL KINGDOM, returned in time for the Foundation's trustee meeting and the annual Garden Party at the Park. Having met scientists, statesmen and business people in England, Belgium, the Netherlands and France, he came back encouraged by the results of his first-hand discussions of resource needs and population trends held with a wide range of British and Western European leaders of thought and action. He was also able to observe briefly land conditions existing today in Spain.

Mr. Osborn visited the London Zoological Gardens, the Vincennes Zoo in Paris and the Amsterdam Zoo.

At Geographical Conferences

At the Geographical Conferences to be held in Washington during the period from July 15 to August 15, the Conservation Foundation will take an active part in a number of ways. At the Pan American Geographical Consultation, attended by scientists from the Americas, the incidence of soil erosion in the Western Hemisphere will be discussed, and the Foundation's maps will be shown for the purpose of interesting geographers in the use of the findings developed by our Soil Erosion Survey. At these meetings the Spanish-Portuguese versions of "Yours Is the Land" will be shown and descriptive material will be distributed.

Three of the Foundation's "Movie Memos" will be shown and described at the Teaching and Methodology Committee of the Consultation. An exhibition of maps illustrating the progress of the Foundation's study of Ground Cover and Water Yield will be a part of the U. S. National Exhibit, and these will again be shown at the meeting of the International Geographers Union. At this latter meeting a paper will be presented by Dr. Lionel A. Walford on the subject of marine resources in relation to world food needs. The Foundation's longer films will be shown at the meetings of the National Council of U. S. Geography Teachers.

Conservation Education Survey

The Foundation has undertaken to gather together written summaries on the status of education in conservation at various levels and in various areas, these papers to be prepared by leaders in the several educational fields included. Additional statements are also to be sought from organizations and groups concerning the work they are now doing or hope to do in conservation education.

These documents will be combined in a printed report to be circulated in advance of the Conference on Conservation Education to be held at Purdue University on September 15 and 16.

Yankee Clam Flat Laboratories

Future Cape Ann-Cape Cod travelers may be puzzled when they see groups of high school boys and girls ranging over the clam flats, particularly those at Ipswich and Falmouth, Massachusetts. In explanation, these are biology classes using their immediate environment as outdoor biological laboratories.

This pilot project, conceived by the Foundation and enthusiastically greeted by the local school administrations, may be the forerunner of an important development in conservation education.

"Atlantic" Article by A. W. Smith

In an article entitled, "The Wealth We Wasted," A. W. Smith, Vice President of the Conservation Foundation, traces the story of American resource use from the Pilgrim Fathers to the present day in a timely and amusing article, appearing in the current issue of the *Atlantic Monthly*.

This able presentation is based on an address which Mr. Smith made before the American Historical Society last December.

BEHIND THE SCENES

NEWS AND NOTES OF THE ZOOLOGICAL PARK, THE AQUARIUM AND THE DEPARTMENT OF TROPICAL RESEARCH

Our Indian Rock Pythons Grew Three Feet in a Year

July 20 marked the first birthday of three unusual Zoo babies. The occasion was not observed with a cake and the blowing out of candles, although the babies did blow and hiss vigorously when taken out to be weighed and measured. One year ago on this date our three young Indian Rock Pythons emerged from their eggs. They were then only a little more than one foot in length and weighed under four ounces. The snakelings have increased rapidly in weight and length during the past year. On their first anniversary the largest measured four feet two inches in over-all length and weighed a pound and a half. This represents a four-fold increase in length and a six-fold increase in weight — an unusually rapid growth rate. The other two individuals are only slightly smaller than their brother.

Indian Rock Pythons have been known to breed in captivity when about seven years of age and twelve feet in length. If our babies continue to grow at their present rate, they will reach this size in only three years. Observations on captives suggest that the rapid growth of the first year or two is not maintained and that subsequent growth is at a slower rate. We hope that our "babies" will continue to thrive and will give us definite information on these points.—J.A.O.

New Fishes at the Aquarium

The Aquarium has acquired a number of new and noteworthy fishes, among them a fine specimen of Arowana, two kinds of Australian Rainbow Fishes, Silver Tetras, Golden Blind Cave Characins and Swordtail Characins. Five species of live-bearing topminnows, ones not commonly seen in collections, have been obtained for exhibition and for scientific study. Another Mudspringer has been added to our special exhibit of this amphibious fish. We have apparently solved the difficult problem of feeding these insect-eating creatures by maintaining cultures of *Drosophila,* the fruit fly so well known in genetics laboratories. We raise a strain that has vestigial wings and is therefore unable to fly out of the tank, but is nevertheless lively enough to attract the Mudspringers and entice them to feed.

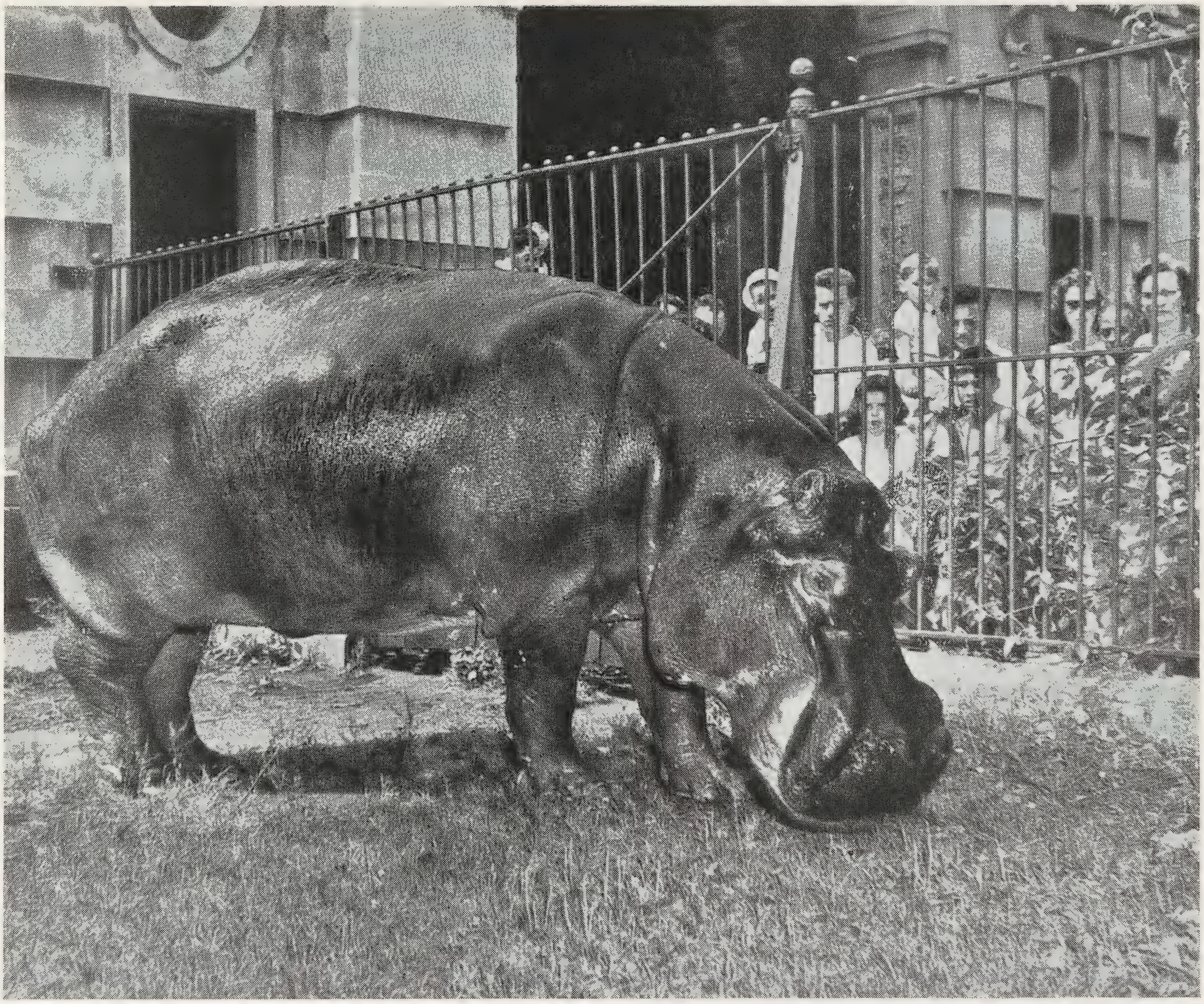
Along with the new Mudspringer, we purchased two peculiar fish which appear to be intermediate in both structure and behavior between the Mudspringer and the more ordinary gobies from which it undoubtedly evolved. These two as yet unidentified fish have heads and bodies of roughly the same shape as those of the Mudspringer, but their eyes do not project so far above the head, nor are their fins arranged for traveling on land. Unlike the Mudspringer they do not voluntarily leave the water. They do, however, come close to shore, resting with their eyes projecting out of the water, frog fashion.

Goldfish in Prospect Park Lake Weighed 2½ Pounds

A seining crew from the Aquarium caught, tagged and released nearly 100 fish in Prospect Park Lake in mid-July at the request of the Park Department, and among other specimens captured a Goldfish that weighed 2½ pounds. Curator Coates is able to give assurance, however, that Goldfish kept in small bowls or tanks at home are not likely to attain such a size; the Prospect Park specimen grew large because it has plenty of "growing room" and plenty of food.

Ninety-seven fish were tagged, including two Largemouth Bass, two fairly large Catfish, Sunfishes of two kinds, Pearl Roach, White Perch and Calico Bass.

The tagged fish were turned loose in the Prospect Park Lake preparatory to the start of a fishing tournament sponsored by a Brooklyn department store.



Two days after his forty-ninth birthday, Pete the Hippopotamus voluntarily emerged from his swimming pool and made a brief tour of his yard. Visitors crowded around to see him.

At 49, Pete the Hippopotamus Has a Touch of Arthritis

Ever since he broke the world's record for longevity of a Hippopotamus in captivity, Pete, our elderly specimen, has been an object of interest to newspaper photographers on the anniversary of his birth in Central Park Menagerie on July 13, 1903.

This year, as usual, an announcement was sent to New York newspapers stating that Pete was about to become 49 years old and that his health was excellent – indeed, that he had even regained most of the 500 pounds he lost in his first attack of old age two years ago.

The announcement was mailed on Thursday before Pete's birthday on Sunday, and was carefully checked by the Mammal Department and with Pete's keeper, Bob Montana. Everyone gave assurance that Pete was in excellent health and spirits.

On Friday Pete remained in his pool all day. It was the same on Saturday and on Sunday – his birthday. Photographers came but he could not be induced to come out and show more than his head and back.

By Monday, when he had had nothing to eat for three days, Keeper Montana induced Pete to come out by starting to lower the water in the pool. Then the reason for his shyness became plain: he limped painfully in his right hind leg as he climbed up the steps from the pool.

Our Veterinarian diagnosed the trouble as a form of arthritis from which Pete has suffered occasionally in the past, always heretofore recovering without treatment.

Pete proceeded directly from his pool to the

corner of his compartment where food was awaiting him, and ate voraciously. Then he returned to the pool.

The following morning when Keeper Montana went to Pete's end of the Elephant House to see how he was getting on, the Hippopotamus was missing. For a moment Montana wondered if Pete had died and his body had sunk to the bottom of the pool. Then he saw a wet trail from the pool to the open door — and out in the yard he saw Pete calmly munching tall grass.

Since then Pete still spends most of the time in his pool, where the water supports the weight of his 4,500-pound body, but he emerges for his meals without much coaxing. There is a very good chance that Pete will attain at least the half-century mark.

"Baby Chick" on Lawn Was An Albino Robin

An interesting bird rarity came to the Zoological Park in June when Mrs. J. A. Bantel of 87-22 253rd street, Bellerose Manor, Long Island, telephoned and with considerable surprise in her voice announced that she had seen "a baby chick" running across her lawn, had caught it — and it turned out to be a pure white Robin!

The youngster, hardly large enough to be out of the nest, is now being hand-fed by the Bird House keepers, and is following the normal rate of development. We have occasionally had albino Robins before, and previous specimens have always, when they attained adult plumage, developed a sandy tone on the breast. Otherwise their feathers remain pure white.

Although it is pure white now, this young albino Robin will probably develop a sandy-colored breast as it takes on its adult plumage.

Dr. Nigrelli Busy at Bimini

Dr. Nigrelli, the Aquarium's Pathologist, recently returned from a month's stay at the Lerner Marine Laboratory on the island of Bimini in the British West Indies. While at the Laboratory, Dr. Nigrelli made observations on an unusual tumor that regularly occurs in a fish common to the area. Fish tumors are generally very rare in nature, and the relatively high natural incidence of this particular one makes its study especially interesting.

With an eye toward the operation of the proposed Aquarium at Coney Island, Dr. Nigrelli tested several new helminthicides to determine whether or not they might be useful in ridding fishes of the parasitic worms they frequently bring into captivity from the wild — and which cause devastating epidemics when introduced into aquariums. He found, however, that all of these recently developed chemicals were too poisonous to fishes to be of any use.

Dr. Nigrelli also investigated the deadly substance produced by sea-cucumbers. These relatives of the starfish apparently protect themselves by releasing the substance — which Dr. Nigrelli has named Holothurin — into the water whenever they are molested. Dr. Nigrelli found that an extremely minute quantity of it rapidly kills fishes, salamanders and mice, by causing severe hemorrhage. Because it is so powerful and because of the peculiar way in which it works, the effect of Holothurin on certain kinds of cancer is now being studied. — J.W.A.

No Platypus Eggs

Two attempts in successive years to create conditions that will induce our Duck-billed Platypuses to breed have ended in failure. One final attempt will be made this fall and early winter.

When they are taken indoors in mid-October, they will find a nesting box attached to their winter Platypusary. If, as now appears probable, their breeding cycle has not reversed with the

When people speak of a "graceful swan," they always mean an adult swan — for there is nothing particularly graceful about a cygnet. Here are two of our Mute Swan cygnets.

reversal of seasons from the southern to the northern hemisphere, there is a chance that they will breed in what is fall to us but spring in their Australian home.

Cecil and Penelope were taken out of "winter storage" in the basement of the Bird House on April 21, three weeks earlier than in 1951, and were allowed to be together in their out-of-doors Platypusary until June 29. Penelope showed only irritation and fright in the presence of Cecil, and consequently at the end of June they were separated and placed on exhibition, each on alternate days, as in the past.

* * *

At his latest weighing, on July 5, Herbert the Walrus weighed 619 pounds — a gain of 379 pounds since he came to us on October 18, 1951, at an age of about six months.

Flamingo Nest Abandoned

At rare intervals Flamingoes in our collection have made half-hearted attempts at nest building, but they have seldom carried the idea as far as they did this year. The American Flamingoes in the pool near the Aquatic Bird House started a mud nest in June and carried it to a normal height of about 9 inches before losing interest.

Flamingoes breed regularly at the Hialeah Race Track in Florida, and recently the San Antonio Zoological Garden's American Flamingoes nested and hatched a single bird.

PUBLICATIONS OF INTEREST

MIGRATION OF BIRDS. By Frederick C. Lincoln. 23 maps with bird figures, in black and white, by Bob Hines. 101 pp. Doubleday and Company, Garden City, New York, 1952. $1.

In this little book, Mr. Lincoln has concentrated the essentials of ancient conjectures concerning the annual travels of birds, the facts that have rewarded the continuing efforts of students and the most recent explanatory theories based on these data. Mr. Lincoln is himself a leader in this field and no one is better qualified to provide a condensed account of one of the most baffling of biological "mysteries." — L.S.C.

BURGLAR IN THE TREETOPS. By George Heinold. End papers and 16 black and white drawings by George Ray. 242 pp. Henry Holt & Co., New York, 1952. $3.

George Heinold is Assistant Chief of Police in his home town and spends his spare time looking into the ways of the wild creatures native to such forests as remain in the state of Connecticut. That these animals are more numerous and more varied than one might suppose is evidenced by the sixteen chapter heads: The Raccoon (Burglar in the Treetops), The Gray Squirrel, The Red Fox, The Gray Fox, The Mink, and so on through the list of the more noticeable mammals of the area. Mr. Heinold's book is written for easy reading, with no technicalities and much useful information.
— L.S.C.

UNDERSTANDING HEREDITY. AN INTRODUCTION TO GENETICS. By Richard B. Goldschmidt. Pp. ix + 228, illus. Published by John Wiley & Sons, Inc., New York, 1952. Price $3.75.

In view of the adoption of an official viewpoint on genetics by the Soviet Union, persons well informed in current affairs may find it increasingly valuable to have a knowledge of the fundamentals of that science — the better to distinguish scientific fact from political philosophy. Professor Goldschmidt of the University of

California, one of the greatest living geneticists, has directed this elementary book toward the non-biologist in order to enable him to grasp the essentials of genetics with a minimum of effort.

Professor Goldschmidt has achieved his aim. The book's illustrations, its glossary and the section containing problems for the reader to solve all help his simple, lucid test make clear an intrinsically difficult subject. Moreover, this is a well balanced though elementary presentation of the basic facts. Such balance could be attained only by a professional geneticist who, like the author, is widely versed in practically every aspect of the entire field. – J.W.A.

HANDBOOK OF TURTLES: The Turtles of the United States, Canada, and Baja California. By Archie Carr. xv + 542 pp., 82 photographic plates, 37 line illustrations and 14 tables. Comstock Publishing Association, Ithaca, New York, 1952. $7.50.

The United States, compared with other countries, is endowed with a large turtle fauna. Among the states, Florida has the greatest diversity, with more than thirty different turtles occurring within its boundaries, and thus it seems fitting that an outstanding contribution to the knowledge of our native turtles should be produced by a resident Floridian. Dr. Archie Carr of the University of Florida is exceptionally well qualified to write such a book because of his wide field acquaintance with so many of our native turtles, not only in Florida but in other parts of North America. The life history accounts of many of the species are richly flavored with anecdotes culled from this personal acquaintance. The blend of anecdote and colorful writing makes a grand book on this interesting group of animals whose ancestors were "watching as Eohippus begat Man O'War and a mob of irresponsible and shifty-eyed little shrews swarmed down out of the trees to chip at stones and fidget around fires, and build atom bombs."

This book is another in the excellent series of handbooks that have been published under the Advisory Editorship of Dr. Albert H. Wright. Like its predecessors in the series, the *Handbook of Turtles* includes "keys" for the identification of all of the forms, descriptive life history accounts of each form, photographs of each, and sections on the general biological functions of turtles as a group. The lengthy bibliography at the end of the book provides an ample source of material for thoes who wish to read further on the ways of the turtle. As an added convenience important references are listed for each state and province in the area covered. One topic that this reviewer regrets to find omitted is an account on the proper care of turtles as pets. Museum and zoological park staffs are constantly plagued by inquiries on this subject. Much pertinent information is included on this under the separate species accounts, but it would be helpful to have a full section covering the details of turtle care.

The few nomenclatorial changes that appear in the book result from the increased use of trinominal designations for forms previously treated as distant species, or a few name shifts. Dr. Carr has introduced a revised system of nomenclature to replace the confusingly similar terminology used for the bones and outer horny plates of the turtle shell. Since these structures are much used in classification, the elimination of this confusion will be most valuable.

The *Handbook of Turtles* is a much needed and most welcome addition to the herpetological literature. It is scientifically accurate and written in a pleasantly readable style. A few hard-bitten souls may object to some of Dr. Carr's flightiness or his use of anthropomorphic shorthand, but most readers will find his style refreshingly sprightly. – J.A.O.

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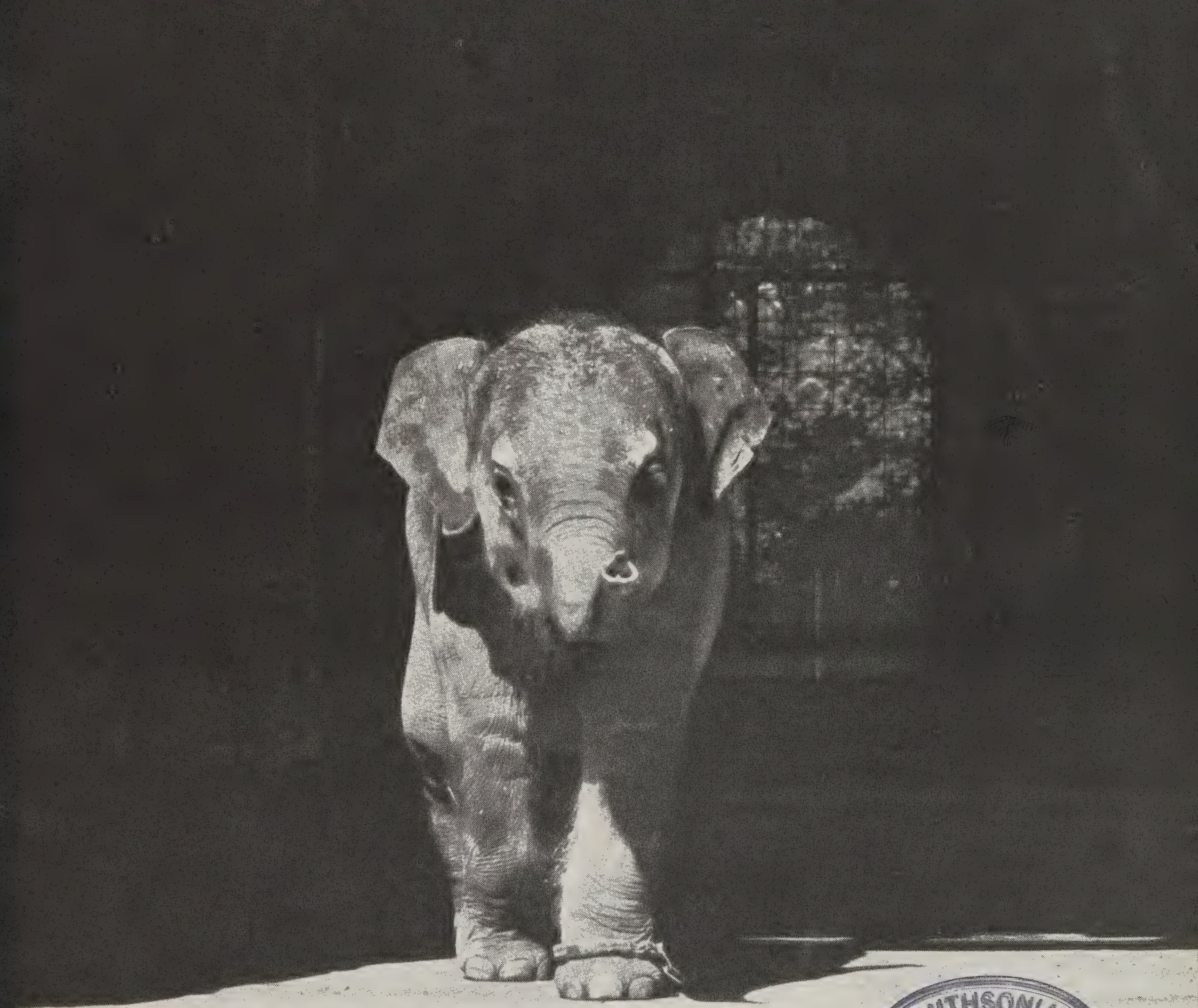
ANIMAL KINGDOM



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ANIMAL KINGDOM

Bulletin of the New York Zoological Society

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Wilderness

THERE ARE ESSENCES in human life which defy analysis. Who can measure the influence upon the human spirit of an inspiring passage of music or of a radiant line of poetry or prose? The inner being of man is forever something apart from utilitarian or material influences. The story of Christ going into the wilderness has been accepted through the ages not merely as a symbol but as an essential episode in the personality of an individual. "I will lift up mine eyes unto the hills from whence cometh my help" is a prayer flowing naturally from the human heart that senses the oneness of the individual and the natural world.

Our era is one of pressures from without. There is nothing startling in this — it is the way of man, indeed of all life. Faiths have always required defense as have all precious things. Among the latter is *"wilderness"*. We in America still possess such regions, a diminishing few — sanctuaries where even the wildest creatures are quiet and at home.

Let's not let them disappear — they give strength to those who go to them, and always will.

Fairfield Osborn

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OCT 8 1952

THE TURQUOISE TAPIR OF TOTONICAPAN

By JOCELYN CRANE

EVER SINCE some particular caveman started the first sketch of a local beast on a rocky wall, human beings have been trying to draw a horse. Or a cow. Or to make a lion out of butter or a dog out of soap. Once I watched a girl fashion a rather attractive amoeba from platinum. Mohammedans, almost alone, have never been allowed that kind of fun; they believe that anyone who makes an image of an animal will, come Judgment Day, be called upon to give the creature a soul. But almost all the rest of us have at some stage felt the way Rosa Bonheur obviously felt all her life — excited, and often exasperated, and, throughout, full of affection for our subjects. Most of us, however, recover nicely from that particular artistic ambition by the time we have finished with the whooping cough.

We never, however, outgrow our national fondness for animals. From childhood we are accustomed to healthy pets, humane zoos and national parks full of saucy bears; as a result, a love of living creatures is as natural as animal crackers. Nowadays, if we have no youngsters to take to the Children's Zoo, we go anyway, against the rules and not even sheepishly. We duck under the Pony Bridge, talk openly with Deacon-the-Crow, and end by patting a llama on the nose.

Often it seems that the warmth of other nationalities toward their animals is a sort of index of our spontaneous sympathy with them as a people. Regardless of their century, gods or government, it applies to all kindred spirits from the old Chinese painters of herons to Gilbert White and his book about Selborne. Even before I went to Guatemala this summer, I had always had a friendly feeling for her people: it seemed that they must be specially *simpática* since they dot their blouses with flowers and birds, and scatter the quetzal, their national bird of freedom,

on everything possible from blankets to stamps. According to legend, quetzals die in captivity, which is why Guatemala's founding fathers adopted the symbol in the first place; the fact that the fabulous birds live so well in the Bronx Zoo seems to afford further evidence of basic Guatemalan-North American affinity!

For years in Latin America we in the Department of Tropical Research have had fun watching for just these things, for the place of animals — especially wild ones — in the lives of the people, and in their arts and crafts. Any youngster in the hot lowlands may have a peccary or a monkey for a pet. If, however, his elders take the time and thought to use such a creature in a design, something more than a child's love of pets is indicated. Those are the signs we watch for, at odd moments in our travels.

In the old days, of course, before the conquest, jungle animals played an important part in religion and symbolism, a part which has now largely vanished, save for a few exceptions like the quetzal. We all remember, at least from pictures, jaguars of stone and jade from ancient Mayan tombs. Probably most of us city children were conscientiously exposed, about the age of 10 or 12, to the actual treasures in museums, perhaps on alternate Saturdays to our visits with live jaguars in the Zoo.

Much more attractive than those squarish and toothy forms are the small golden ornaments and charms. In one collection in Bogotá — so precious the shining things are kept locked up in a bank vault — I counted nine kinds of animals among the little figures of gods and men. There were fish, frogs, snakes, an iguana, a crocodile swallowing a man, a harpy eagle, curassows, a toucan sleeping properly with his tail over his back, and a monkey. There was even a necklace of golden cicada nymphs. Like the stone jaguars of the north, these *huacas* were probably fashioned long before the conquest; it was objects like them that led the Spaniards on to further search for treasure.

Nowadays, with so many of the tropical forests destroyed, it is hard to find the old jungle motifs in any post-conquest design. When we do find a bird that isn't a mere chicken, we feel as happy as a hunter for pirate treasure with a genuine gold doubloon.

Once we were in Salvador during the Christmas market. Dr. Beebe has written of that day: "Here were thousands upon thousands of tiny clay images, all made by hand, from minute beings less than an inch long to three-foot dragon creatures born of untrammeled imagination . . . armadillos, guinea hens, vultures, squirrels, soldiers, clowns, saints and washerwomen. . . . Local color was occasionally introduced into the diminutive Noël crêches, and often in place of the attendant burros and cows there were realistic spoonbills, zopilotes and armadillos. It was easy to visualize and excuse the workings of the Indian mind . . . in unconsciously populating the villages of Palestine with unmistakable neotropical fauna."*

In Latin American churches, animal motifs are almost as rare as in Mohammedan mosques, except of course for a few inevitable lambs. But once in Colombia I had wonderful luck. It was on a hot noon in Cali, where we were waiting for space on a south-bound plane. We wandered thankfully into the cool dimness of the ancient church of La Merced. By the altar was a figure of the Virgin. As our eyes grew used to the light, we saw that her robes were scarlet and blue, splashed with gold, and her baby had rosy cheeks. Altogether she looked cheerful, placid and well-adjusted.

Then the priest told us her story. She did not always live there. Long ago, she was brought to this highland church from a jungle valley near the sea. Several times she unceremoniously vanished to her original niche, and had to be brought back. Finally, to help her feel at home, an understanding *padre* painted her new altar with jungle scenes, and among these she has lived happily ever after. And there around her we saw the paintings: great tropical trees, complete with buttress and lianas, airplants and blossoms. There were birds, too, including an unmistakable scarlet macaw, a king vulture, and another bird which looked very much like a cock-of-the-rock.

Both the Salvador market animals and the Colombian Virgin's private jungle we found by accident. With the turquoise tapir in Guatemala it was different. I was looking for him, and, one way and another, it was quite a hunt. I was having a busman's holiday on the way home from

* "Book of Bays," p. 143.

our Trinidad station, and had stopped off in Guatemala to work with fiddler crabs in the mud of the Atlantic coast. After that, there remained two precious days, completely free, before my plane left for home. There would be just time for a short trip to the highlands, to the heart of Guatemala, where the Indians have Mayan blood, chatter in ancient dialects, and wear brilliant homespuns for everyday.

craves a burst of outrageous color — a blaze of magenta and orange, even, absolutely side by side. Highland Guatemala was, by all accounts, the place to find it.

The tapir hunt started in the archaeological museum in Guatemala City. I had passed several hours in that beautiful and stimulating place, admiring the treasures from the Mayan ruins, making notes in the garden patio, and, finally,

Always, after any muddy session with fiddler crabs, a colorful postscript is welcome. The crabs do their best to spruce up their environment by waving shining claws of pink or white. But they thrive only in desolate wastes of drab mud and olive-green mangroves. Even a tropical mangrove sky, during the best season for fiddler-study, is either dark with rain or a merely wishy-washy blue. After days of that scenery, the human spirit

trying to memorize a few of the principal textile designs from the various highland regions. I had just about decided to spend those two free days in Chichicastenango when a white cotton blouse, a typical *huipil*, caught my eyes in a case by itself. Like all these old-style Guatemalan blouses, it was in pattern simply a length of cloth with a hole for the head. Around the neck, yoke fashion, were four wide bands of solid embroi-

dery, a rich design of plum purple, turquoise-green and magenta, all accented with yellow and black and assembled with taste and skill.

But the subject was the prize. A whole jungleful of animals paraded round and round, among a luxuriant display of Monstera leaves, pond lilies and, perhaps, tropical passionflowers. There were black spider monkeys with magenta eyes, cavorting yellow deer, alert rabbits in plum, and a somewhat questionable anteater. There were herons too, one of which was molting his tail-feathers, and an assortment of ducks. There was even a pride of old-world lions, full-maned and rampant, which certainly never prowled a Guatemalan forest, and some similarly outré peacocks. Finally, nicely spaced, were four creatures in turquoise which seemed the most appealing of all. They had the short legs and curved snouts of that prehistoric-looking beast, the tapir, and they sat absurdly back on their haunches, as real-life tapirs will. In spite of the glass case and the blue-green floss, it was easy to imagine a swampy wallow around them, and almost to smell the tapir odor – half horsey, half unique.

When Señorita Martinez of the museum staff told me this blouse was at least forty years old, I at once decided how to spend my holiday. It would be a hunt for people who might, even now, be making turquoise tapirs. Such folk, if they still lived, must love wild animals to do them so well. The señorita warned me, however, not to expect too much; today's work she said, whatever the subject, was usually far more hasty and garish than the pieces of long ago.

On the label the blouse's place of origin was clear: the Department of Totonicapán. Unfortunately, in my final hasty note-taking near the museum's closing hour, I omitted some small-type geographical details. It turned out that these would have been most helpful next day, when I found out how many mountains Totonicapán contained.

When hunted up on the map, the region proved to be high in the midst of the Maya-Quiché country, which, even today, is considered the artistic center of the republic. But the strange riddle was why temperate-zone mountaineers should embroider tapirs and monkeys, which, in Guatemala, live way down in the tropical jungles. A second problem was how these Indians should be on such apparently intimate terms with lions and peacocks.

Answers to both these questions turned up before I ever reached the highlands. It seems that mountain people in this country yearly migrate down to the lowlands to work on the coffee fincas. There they can, or could – the forty years ago *the* blouse was made – easily find models for their *tierra caliente* animals.

The alien peacocks and lions were explained as simply. The conquerors brought in the peafowl, which are now not at all rare in the country. As far as the lions are concerned, people have loved zoos and circuses throughout history. In Guatemala's zoo, near the museum, I saw what could have been the origin of the artist's lions. Two Indian country women, no doubt in for market, and a small girl marched single file through the gates and swerved straight over to the lion's cage nearby. Each, including the youngster, carried a basket on her head and wore full Indian dress. They stayed there five minutes, pointing and chattering. Then they turned suddenly and marched out again, looking pleased and not wasting a glance on the local monkeys.

The next morning a plane flew me to Quezaltenango, in the heart of the highland country. Although the same journey would have taken the conquistadores dangerous weeks, we made it, past blue Atitlán and assorted smooth volcanoes, in just thirty minutes. The capital of Totonicapán, where, I hoped, people still embroidered turquoise tapirs, lay only an hour or so from Quezaltenango.

The bus was jammed that afternoon with Indians on the way home from market. Even at the end of a wearing day they were cheerful and clean. The only dirty face in sight belonged to a little boy, who was one of my four seat-mates, the others being his mother, his nursing baby sister, and a small and immaculate pig. The only smells detectable, save for alternate waves from some fish and roses up front, was a faint

t was this section of a white cotton blouse in a museum in Guatemala City that started Miss Crane on her search for the creator of the "turquoise tapir." This embroidered huipil is about 40 years old.

ABOVE — The Friday market in the plaza of San Francisco el Alto is famous for livestock and textiles.

BELOW — This is the passageway that leads to the market, where Miss Crane hoped to find the old designs.

whiff of woodsmokey Indian, nostalgically familiar to all of us who enjoy prowling around south of the border.

Suddenly the mother whisked her yellow-ribboned braids up over her neck and pinned them high. It was then I saw she had a pair of birds embroidered among some flowers around her collar. My hope died quickly; she said they were just doves, and only giggled and shook her head when I asked for monkeys and tapirs.

That afternoon it was the same story everywhere. Totonicapán was, zoologically speaking, a failure, though otherwise a delightful town. But, *huipiles* with *animales* from the *tierra caliente*? Oh, no! And giggles always followed after.

The next morning I left at dawn for San Francisco el Alto, almost 9,000 feet up in the mountains above. Every Friday they hold their market, famous the country over for livestock and textiles. It was Friday now, and perhaps, in all that crowd, there would be some blouses with jungle beasts.

Nine of us, including eight full-grown Indians, squeezed into an old five-passenger Dodge. Our breaths showed clearly, this fourth of July, and

This market vendor had plenty of colorful fabrics, but none with animals. She was too shy and too afraid of the "evil eye" to look directly at Miss Crane's camera.

we were glad of our crowded company for warmth. Since all the women afoot along the way were warmly wrapped, it was quite impossible to catch even a glimpse of their huipiles.

In San Francisco the market was all in the open air, cramming the plaza and pouring out on the adjacent streets. Although quiet, it seethed with life. Its color made the drabness of my recent mudflats as unimaginable as, when you are dining on curry, is the taste of a Mulligan stew. Overhead hung genuine stratosphere blue; all around the tile roofs and adobe walls were mellow with sun. And everywhere close by sang the colors of the Quiché heritage — greens and blues and purples in the wrapped skirts; blouses, woven or embroidered, in all the colors there are, juxtaposed in a fine and smashing carelessness. Scarlet marched next to orange; harsh red with green and white; bright pinks; magenta next to chrome. Out of context they would have been deplorable; here they were a glory.

Thanks to rumors of political unrest, tourists had been needlessly rare all week. In this crowd there weren't any at all, so there were no false notes. For hours I wandered about, watching the well-fed, tidy livestock changing hands, bargaining unskilfully for a skirt, taking pictures. The women always turned away from the camera, or covered their faces against the evil eye. Everywhere I asked for white huipiles with animals, with the usual result. Often the vendors spoke no Spanish, but only Indian tongues. But always there was a helpful neighbor to translate the inevitable answer: No monkeys. No tapirs. *No hay.*

Finally, toward noon, tired, hungry, thirsty and discouraged, I gave it up and started down through the packed streets to find a lift back to Quezaltenango. It was all I could do to push through. The only difference between San Francisco el Alto on a Friday noon and Times Square on New Year's Eve is that in Times Square the women don't carry very much on their heads. Almost unconsciously I followed one of the basic rules of a tired naturalist: When you are too fagged to do anything else, make yourself dig just 50 more crabs, or look under exactly 25 more rocks — little ones! — or shake spiders from only 20 more bushes into your collecting umbrella. Or even, if you are beyond digging or lifting or shaking, inspect exactly 15 more trees for cocoons or snakes or nests. So, grimly, I started to peer

at 50 more huipiles. Everything was a blur except the collar region, feminine gender. I had just noticed grayly that No. 45 was nothing but San Cristóbal's flower pattern, and 46 was a nondescript number in blue when – 47 – whoops – there, unbelievably, it was.

For an electric instant nothing showed but a monkey, a lovely green monkey, unmistakably a monkey, with his tail curling properly underneath. Then I saw he was accompanied by a deer, several rabbits, a snake and two lions, purple and rampant on a field of pink. Finally, there came into focus above them the quizzical coppery face of a little, middle-aged woman, squatting behind a basket of corn. Feeling swiftly and miraculously on top of the world again, I asked her where she came from. She looked at me blankly. So did all her neighbors. Not one spoke Spanish.

Finally, nervous under all the attention, she simply got up, placed her basket firmly on her head and, to my despair, slipped into the crowd. But at that instant a passing man came to the rescue. "Who? That one? Oh – *She's* from San Andrés! No, not far . . . Just over those mountains!"

And so it happened, late that afternoon, that I found San Andrés Xecul. The last five kilometers were a climb on foot through tall cedars and thriving corn. The track was full of villagers returning home from San Francisco, keeping me cheerful company. It was fun to think that these people were perhaps actually related to the unknown woman who made the jungle zoo on the museum blouse. Obviously, they too appreciated their animals. A man flicked occasional flies from his lightly-laden donkey. Some women gently herded young pigs before them, carrying the smaller piglets in their arms. As we came into town, dogs came out, well-fed and friendly, wagging their tails even at the foreign stranger in funny clothes. The only trouble was that few people knew Spanish and not a single woman wore a zoo around her neck. Finally, however, a young girl understood and promised to guide me to the right place.

So Miss Crane set out on thi
road from the market town t
San Andrés Xecul, were th
old embroidery was still made

This was the first real clue — a woman from San Andrés Xecul with an animal-embroidered blouse. She spoke no Spanish.

And she found it—a woman actually at work on one of the old designs—although to her, the tapir represented a horse.

She darted away and I followed, pantingly conscious of thin air, steep streets and sharp cobbles. At last we stopped at an open wooden door in an ordinary adobe house.

Inside a bar of sun was bright on a woman seated at a low table. She was stooped over a white cloth stretched on a square frame, working with her needle on a round design in many colors. She looked up and cordially asked us in—in Spanish. I looked beneath her needle. She was just putting the finishing touches on a tapir of Kelly green.

Feeling a triumph comparable to the best moments of Alexander, Columbus and Sir Isaac Newton combined, I put my first question to this undoubted lover of all the jungle beasts.

"Señora, where do you get the patterns for your animals?"

"Well, some we have from long ago. A friend of mine makes others. And some I make from my own head."

"Then do you often go down to the *tierra caliente*?"

"Oh, no. I've never been down there in my life!" Too bad that! Oh, well, now for the animals . . .

I pointed to a row of well-drawn yellow foxes. "What kind of animals are these?"

"Dogs, señorita."

"And the pink ones?"

"Pigs, señorita."

"These purple birds?"

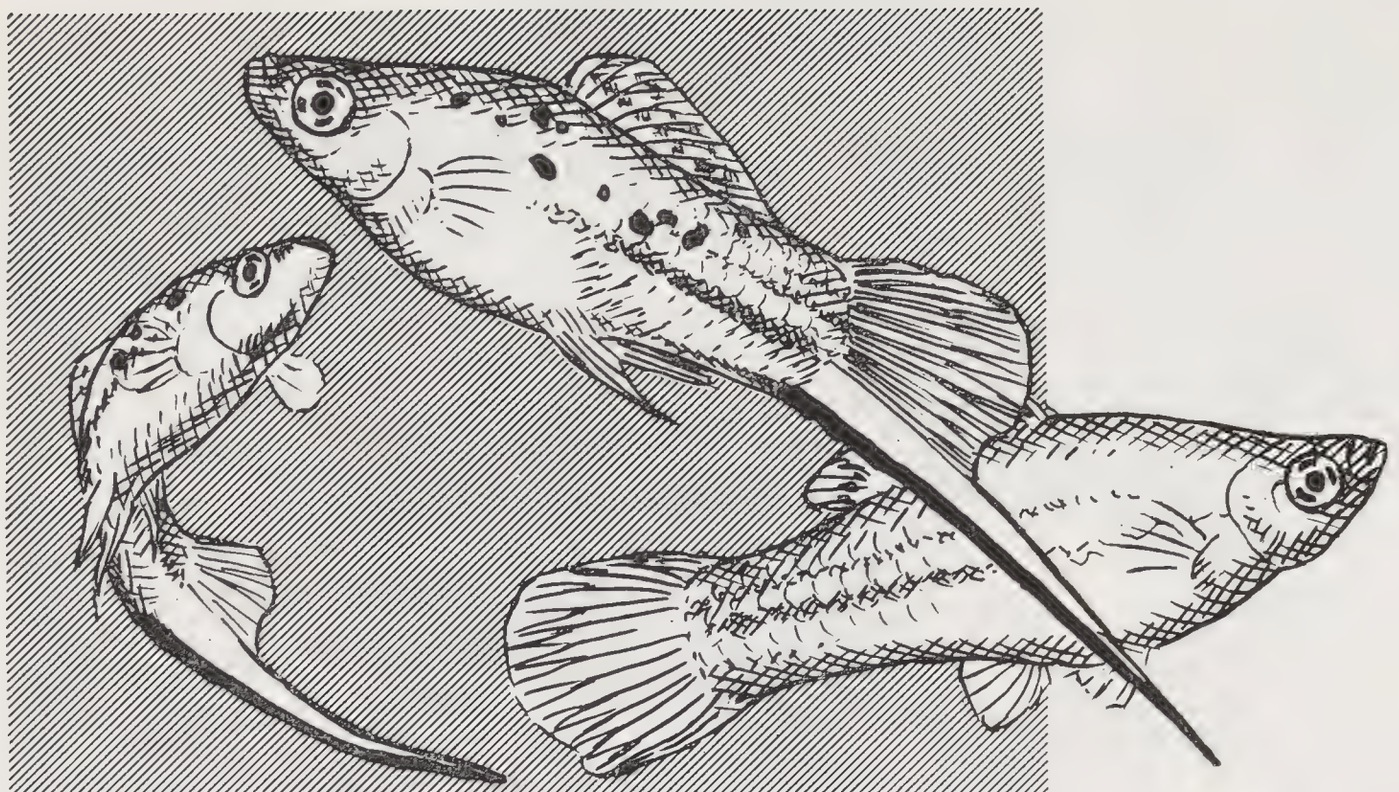
"Chickens, señorita."

Out came my last and best hope. "And this green one with the curved nose?"

She was puzzled a moment. Then, "But that, I think, must be a horse!"

Alexander, Columbus, Sir Isaac and the tapir all faded quietly away. But after all, I reasoned firmly, there were compensations. The blouse in the market this morning had actually boasted a monkey. And later I learned that even the fine piece in the museum also came from this very village. So my links were complete.

We had said our good-byes and I was already in the street when the señora called me back. "Look," she said, "I forgot to show you this." And she proudly pointed out among the pink pigs and purple chickens a single blazing bird in green and gold. "*That* is our national bird. The quetzal. The bird of freedom. He lives only in the far-away forests." She beamed. "We *love* him!"



LITTLE FISH WITH A BIG FUTURE

By

MYRON GORDON

ALL THROUGH THE NIGHT the banana trains were noisily shunting box-cars around the docks that jutted into the Gulf of Honduras at Puerto Cortez. Four giant machines that resembled matched pairs of praying mantises conveyed the bunched fruit into the belly of the *Musa,* one of the many ships of the United Fruit Company's White Fleet. Seventy thousand branches of green bananas, cut that morning by natives with machetes in inland plantations, would be on the high Atlantic seas within the next twenty-four hours, and the golden, ripened fruit would be on your grocer's stand a few days later.

It was an efficient piece of farm-engineering, perhaps, but I wasn't in an appreciative frame of mind as I lay half asleep, half awake, in a hot and humid room in the Hotel Cortez. The hotel, built alongside the Tela Railroad yards, was more suited for a railroad station than a place of rest and repose. Between sleep and wakefulness, as the locomotive and its freight trains passed back and forth tooting shrill warnings, snorting blasts of live steam, and clanging box-car couplings open and shut, I kept worrying about oversleeping and missing my early fishing date at dawn. Every time the train tooted, snorted or clanged I awakened and gazed in semi-consciousness at the luminescent face of my watch. Finally I noticed with relief that its hands stood at 5. Al Campbell, my room-mate, saw me stirring and he got up, too.

In the soft tropical haze of dawn we walked along the palm-fringed beach and beating surf towards the docks to meet the fishing boat as the red sun rose from behind the silhouetted, steaming foothills of the Omoa Mountains. A pair of pelicans rode the gentle swells within the harbor waters. Gaudy but daft macaws screeched rau-

cously, their penetrating cries joining the muffled noises of the banana-loading machines. The chicken-like chachalacas hidden in the heavy jungle brush were in full voice, idiotically out of rhythm and violently dissonant. Ahead of me along the beach a lone sandpiper was beachcombing the furrow of ocean wrack for shrimps, worms and other marine delicacies. When I got close, it stopped its search, teetered its spindle-shaped body up and down on the fulcrum of its legs, piped plaintively, and flew away. High in the branches of a mango tree the oropendulas danced and sang, their song sounding like water gushing and bubbling out of an inverted jug.

The *Bobby Ann* was anchored at the far end of the dock and we made our way to her, step by step, over row-boats, native cedar dug-outs and sleek, neatly painted motor-boats that lay indiscriminately at the wharf. Captain Arzu looked with questioning eyes at my unusual fishing equipment. He must have been briefed to expect a conventional fishing enthusiast whom the Tela Railroad Company had invited for a pleasant day's sport on the Bay of Honduras. The boat was well equipped with heavy trolling rods and reels, stout lines and tackle in the form of large silver spinners. The Captain asked me to choose the gear I preferred.

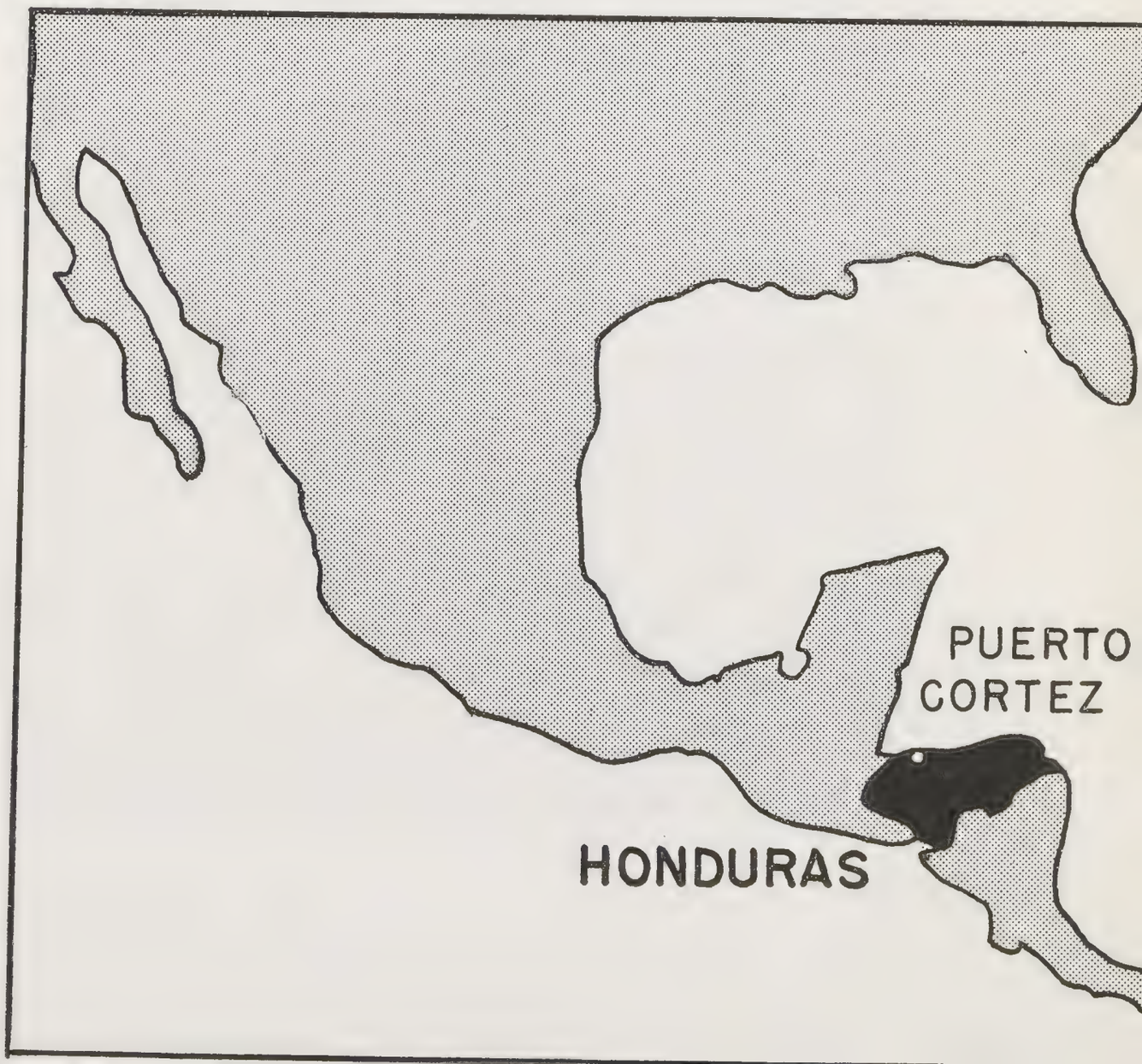
Somewhat embarrassed, I explained that it was not my intent to go game fishing this time. I told him that what I wanted the fishing boat for was to take me to the mouths of every approachable river and brook that flowed from the Omoa Mountains and emptied into the sea between Puerto Cortez and the Honduras-Guatemala border. I would do my fishing there.

I held up my dainty 4-foot-square seine. I showed the captain the fine one-quarter inch mesh of my minnow seine, the cylindrical wooden floats attached to the upper margin and the five tubes of lead on the lower edge. From his expression I gathered he thought it ridiculously ineffectual. I asked Al Campbell to demonstrate its operation. We each took hold of a stout stick, attached vertically to either end of the seine, and marched along the deck of the boat as if we were wading waist deep through a body of water and combing out its hidden fishes.

The captain was both skeptical and perplexed. It was apparent that never before had he met such fishermen. He excused himself politely, saying he had to telephone the superintendent of the company for additional instructions.

It was fortunate that I had talked with Superintendent Joseph Acock of the Tela Railroad Company the night before. At that time I explained that I was doing research work and that I was a staff member of the New York Zoological Society, the organization that operates an Aquarium and Zoo in New York City. I told him that I was in search of two special kinds of small freshwater fishes that we needed as test animals in cancer research.

Like most people, Mr. Acock was surprised to learn that fishes were used in a cancer research project. I told him that fish had cancerous diseases, many of which are amazingly similar in microscopic details to those of man, and almost identical in the course they run. Anything that we could learn of cancer by working with fishes, I stressed, would be of potential value for man's understanding of this disease. I told Superintendent Acock that I was seeking an answer to this question: Are some types of cancer hereditary? Fishes were suited for the study of the inheritance of one particularly dangerous type of cancer known as melanoma, or black cancer. In man this disease is more likely to strike blond people, particularly those with translucent skins, who do not tan when exposed to the sun, rather than dark skinned ones. Negroes rarely develop melanoma. What part do hereditary differences play in making negroes practically immune and blonds particularly susceptible to melanoma? We



Little streams flowing from the foothills of the Omoa Mountains into the Bay of Cortez were the hunting grounds for the black-spotted fish Dr. Gordon wanted.

know that negroes have many more black pigment cells in their skins than do whites, but there is hardly a person alive who does not have some black pigment in his skin. Certain human birth marks may turn out to be the mark of death. Since melanomas are started by malignant black pigment cells growing without restraint, research workers hope to solve the nature of this kind of cancer by studying the causes that transform normal black pigment cells into abnormal ones.

The fishes I was looking for have a peculiar kind of black pigment cell so big that one may spot them quickly with the unaided eye. The fact that these cells are large is not as important as the fact that they are capable of producing black cancers in fishes with a particular kind of heredity. I had already discovered in the laboratory that spotted fishes with large black pigment cells differed from their unspotted brothers and sisters by a dominant hereditary unit or gene. In the melanomas of a fish the disease-producing black cells are almost identical in appearance and action to the malignant black cells in the melanomas of man. That is why investigation of the nature of black pigment cells in fishes is encouraged. It is a good bet that any vital discovery made in the study of the causes of this black disease in fishes will also be of significance in understanding its origin in man.

Two groups of small, live-bearing, Central American freshwater fishes, the platyfishes and swordtails, have among their numerous members some that are spotted with the vitally important black pigment cells. From my previous field explorations in the rivers of Mexico and British Honduras, I knew that the spotted fishes, when found, are rare. We are constantly in need of new stocks of these fishes from many different regions for additional breeding tests. I had every reason to believe that, although practically nothing was known about the freshwater fishes of northern Honduras, we would probably find swordtails and perhaps some platyfish in this area. We hoped that among those we found, some would be spotted with large black pigment cells.

Captain Arzu returned after making his telephone call to his chief. Without further words or delay he told his Carib boy assistant to loosen the line that held the *Bobby Ann* fast to the dock. He stepped below to start the engine and within a minute we were on our way across the Bay of Honduras.

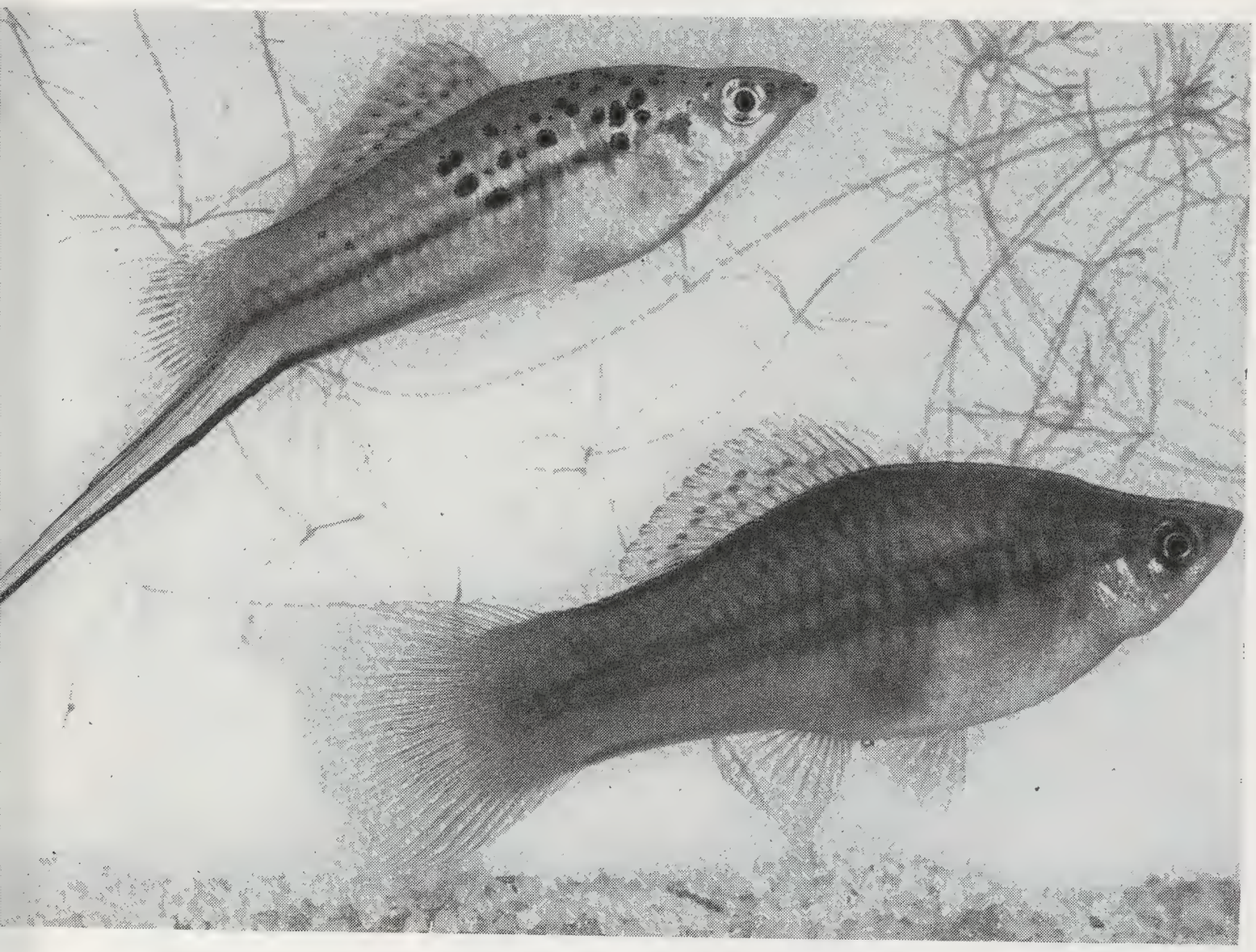
About a quarter-mile out to sea, I looked back along the wake of our boat to the point of our departure. From this distance I saw that the village of Puerto Cortez is built on a narrow piece of land that juts from the mainland of Honduras like a slightly crooked index finger extending from a tightly clenched fist. On the mainland the country is a mass of low-peaked mountains. Within the bend of the crooked finger of land the clear blue sea forms the Bay of

Cortez. The cord that binds this village together and ties it to the mainland is the railroad, for the ramshackle town is strung along on either side of the tracks. On its furthest point out to sea where the peninsula widens a bit, the homes of the workers of the Fruit Company are grouped. Outside of the orderly arrangement of the company's buildings on well-kept grounds that have the atmosphere of a country club, the rest of the town is a tumble-down array of makeshift, unpainted shacks that seem to be characteristic of the unskilled peasantry.

Looking ahead of the bow of the *Bobby Ann* and comparing the contour of the coast line west of Puerto Cortez with my map, I made out another projection of land along the hazy, distant landscape. This was Point Omoa. Just beyond the point lies Campo Verde, an abandoned banana plantation now cultivated privately by some of the more enterprising free-lance Caribs. What interested me at the moment was the information that a freshwater stream, the Río Omoa, ran through the plantation and emptied into the sea just beyond the Point. I asked if it would be possible to stop there and look around. Captain Arzu said yes, and so our goal for the day was set.

When we were well within the cove on the western part of Point Omoa, the captain cut the motor and threw the anchor overboard. We were still about a quarter mile from shore, but the extremely shallow waters prevented the *Bobby Ann* from approaching closer. Our trailing canoe was brought alongside, and the Carib boy paddled us to shore.

The waters that feed the Río Omoa arise from a series of springs that trickle out of the sand and stony areas of the foothills of the nearby Omoa Mountains, and as the river crosses the narrow strip of fairly level coastal plain its meandering waters run deep and are surrounded by an entangling mass of vegetation. The brooks are rarely very long — perhaps a mile or two — and the vegetation closes in so quickly that we had not gone an eighth of a mile before we were completely hemmed in right, left, and from the top by the jungle.



The prizes of the fishing trip — a pair of swordtails. The black-spotted male at the top is rare in nature. The female is below.

It was impossible to use the minnow seine along the deep and heavily overgrown banks of the river, so we went back to the shallow areas at the mouth of the stream. There within sight of the sea we caught several species of fishes that are at home where fresh water mixes with that of the sea: some mullets, cichlids, gobies and eels.

In a spring nearby we caught our only live-bearing fish, a "false-swordtail," *Pseudoxiphophorus*. A wiry, gray-haired negro clad in a tattered blue shirt, bramble-torn dungarees and sock-less, lace-less shoes, located the spring for us, for it was on the land which he was farming. As we stepped over the stubble and furrows hardened by the prolonged drought, he kept

swinging his machete, hacking away at the ever-encroaching saw-toothed cane brake that threatened to overrun his small stand of corn. David Johnstone was a fine, soft-spoken cheroot-smoking gentleman. He had dignity. It was a distinct pleasure to see him managing his life in his own manner – away from the mixed up way of life in the villages. When we had finished our work in his territory he invited us to his hut, built alongside a lagoon. He bade a boy climb one of the tall palm trees and cut down several coconuts with a machete. Back on the ground, the boy skilfully hacked away the outer fibrous covering of the coconut and exposed the soft white meat. Then with a twist of the point of the machete he made a neat inch-long hole at the cut end. After our work in the hot sun the cool, sweet water of the unripe coconut was welcome and delicious.

We had caught neither swordtails nor platyfish that day but we were pleased with our experiences. In Honduras, as elsewhere in Central America, I learned that there's always mañana.

The next day at daybreak we boarded the *Sula* in charge of Captain Marcus Lambert, assisted by our friendly, lanky Carib boy. Mr. Lambert was briefed on our plans in advance and he told us that we ought to go to the most westerly stream in northern Honduras, almost at the Guatemalan border. In our leisurely way westward across the Bay of Honduras we eventually came within sight of the long, palm-fringed sand bar that is formed by the Río Motagua just within Guatemala.

As the *Sula* approached the cove of the village of Masca, I saw a native in a dugout canoe, paddling furiously, round and round, apparently at random. He paddled standing up, steering skilfully and sometimes cutting the water sharply in huge figure eights. Suddenly, he paddled close to shore and then quickly back-tracked out to sea again. Just about the time we landed by a canoe of our own, the erratic canoeist shouted some signal. Immediately another canoe, manned by two natives, shot out from shore and dashed to the side of the first. One of the men stopped paddling and threw an activated bomb into the water; it exploded almost instantly with dull, muffled roar, and a moment later the surface of the sea was broken as stunned fish bobbed up all around. The men reached over the sides of the canoe, grasped the floundering fish and threw them into their boats.

I had mistaken the antics of the first canoeist, for he had not been paddling aimlessly. His job was to discover, follow, and herd a school of tunas into a compact group for mass execution. In a matter of minutes the three men picked up 29 large tunas, some of them two feet long.

In the Rio Mapache we caught our first swordtail, but in small numbers – and no spotted ones.

It was not until the third day's work of exploration through the tiny village of Veracruz, that we found swordtails in fairly large numbers in an unnamed brook. The surf and wind had built up a slight ridge of sand against which the stream backed up, forming a shallow, brackish water pool before debouching into the bay. Near the sea we caught a near relative of the sea horse, a reddish-brown striped pipe-fish, sardine-like silversides with lemon-yellow fins and small silvery mullets.

Around the village the heavy jungle growth had been cleared for farm and pasture and this permitted us to approach the brook at many suitable points for seining. Upstream a few hundred feet in two-to-three-foot-deep pools, we caught seventy red-striped swordtails. One of them had a few large black pigment cells.

We were accustomed to place all the fishes we caught in fruit jars containing a solution of formaldehyde. This preserves them for later study in the laboratory. I emptied one jar of its formalin, rinsed it out thoroughly, filled it with brook water, and placed one spotted and one unspotted live swordtail inside. I made it a point to show them to Mr. Acock when we returned to Puerto Cortez. Neither he nor the natives were aware that these beautiful fish lived in the vicinity. Nor were they aware that some of the smaller fishes give birth to living young.

I took the fish back to La Lima, the headquarters of the United Fruit Company. In La Lima the Fruit Company kindly put me up in one of their clean and commodious guest houses. For a week the swordtails lived in the narrow confinement of a quart fruit jar. My problem was to keep them cool. When we caught them

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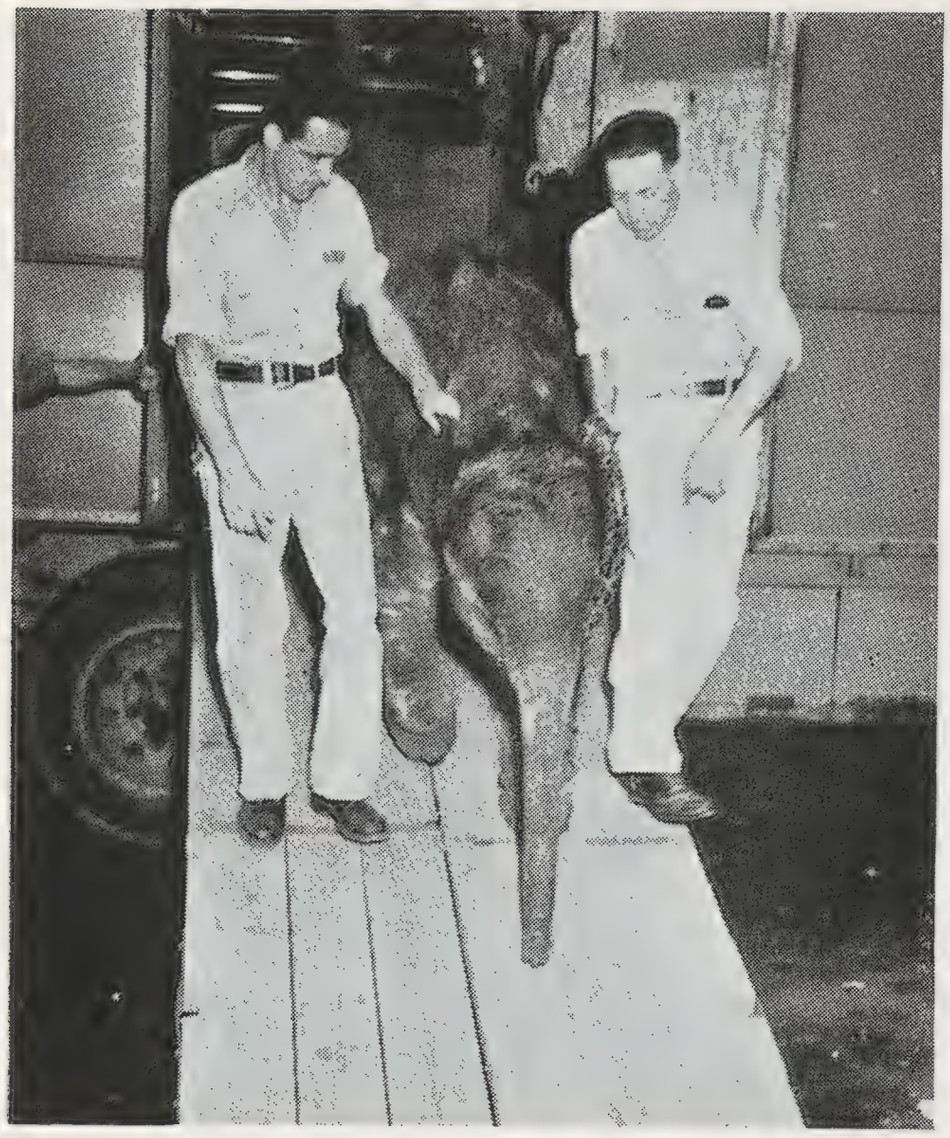
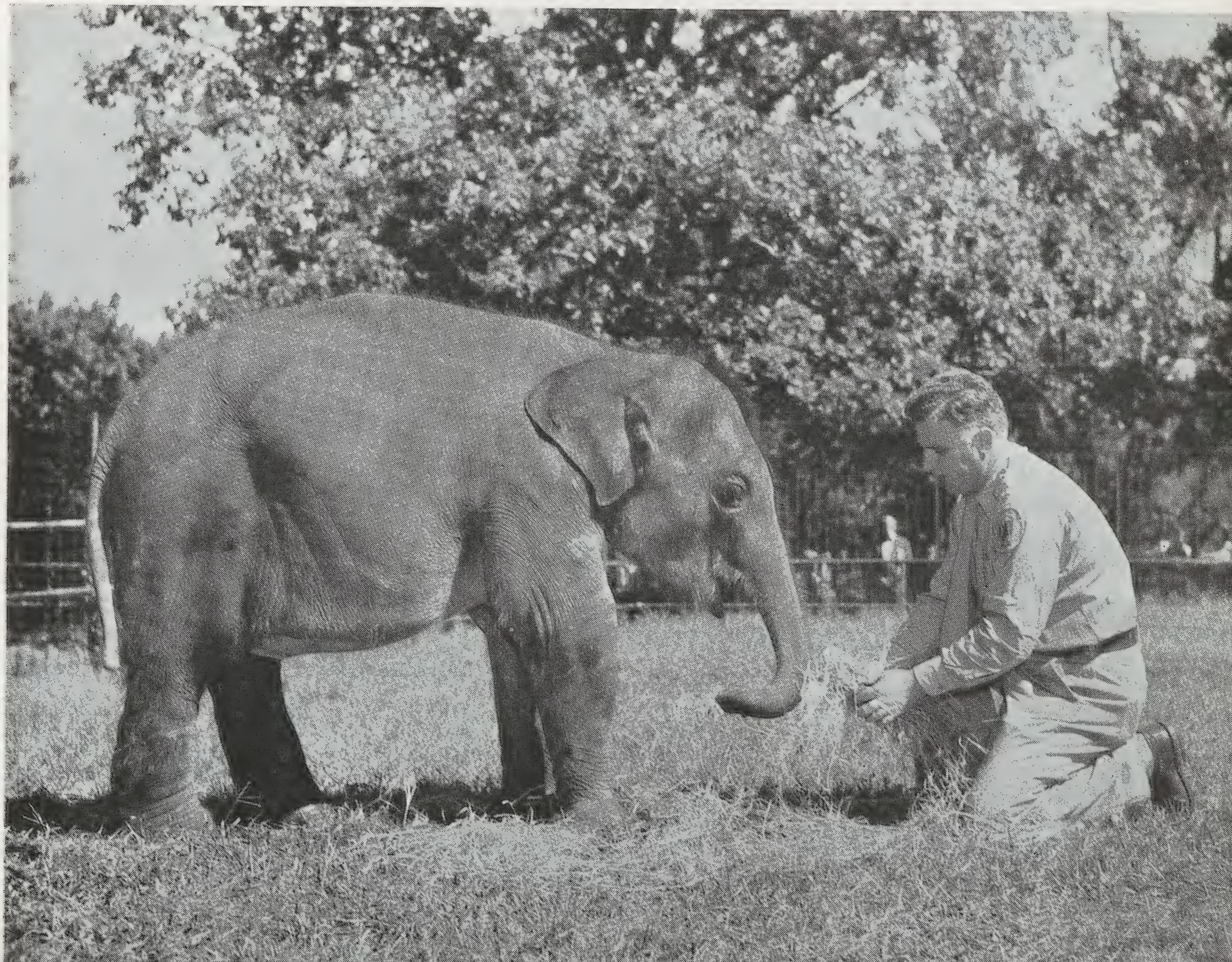


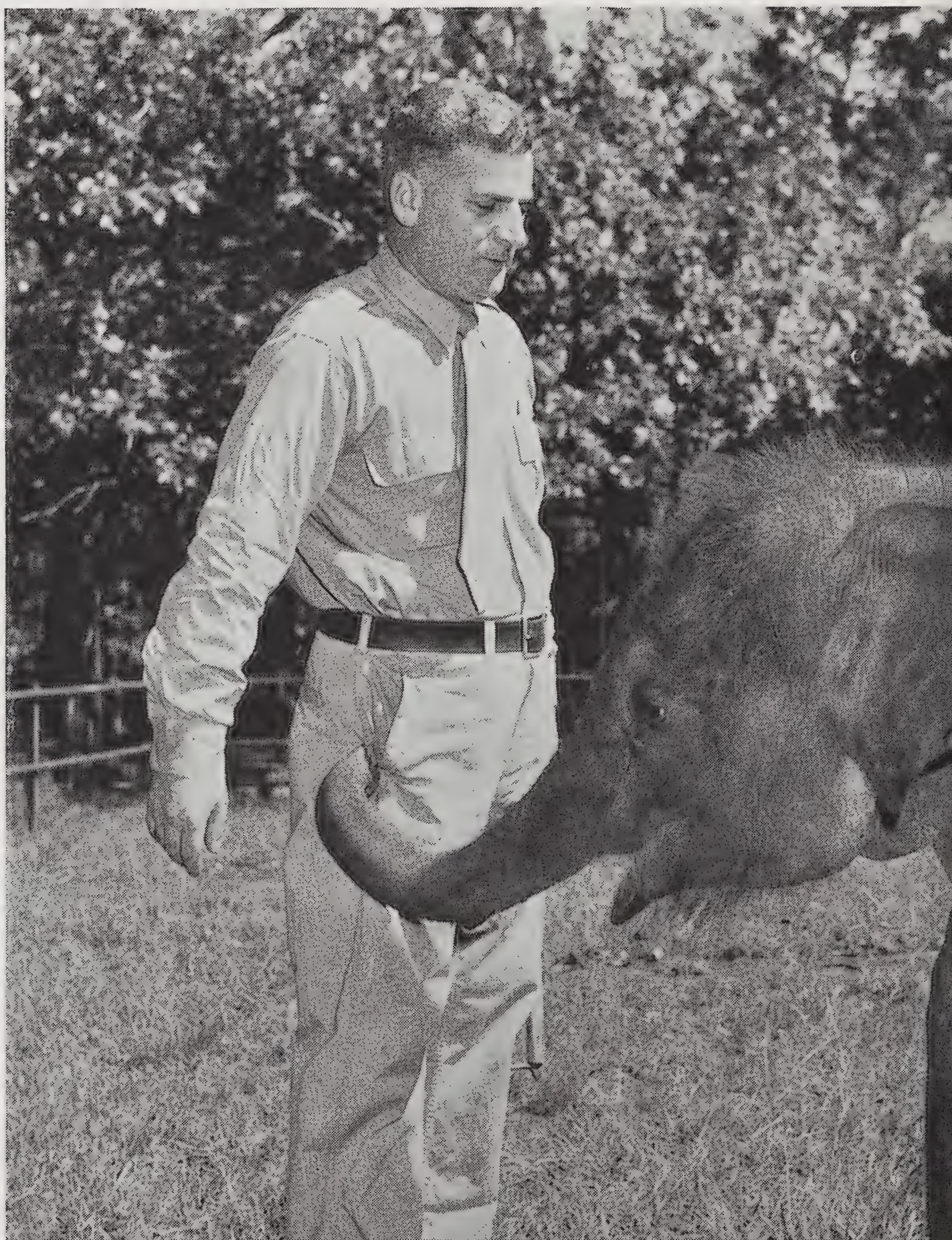
THAT SWEET CANDY!

Photographs by SAM DUNTON

The moment she walked out of the horse van that brought her to the Zoological Park, we knew that Candy was going to be our favorite Elephant. A less self-possessed baby might have boggled at walking down the steep and springy planks, but Candy didn't. And she made friends instantly with Keeper Neil Dapolite who has the duty – and the pleasure – of being her mentor.



The first thought of a baby Elephant—or any Elephant—is food. Candy learned in one easy lesson that Keeper Dapolite was a goldmine of apples, to be quarried out of his pocket and eaten.



Eyes tight shut, exactly like a child, Candy awaits her morning showerbath. But, as the picture on the right shows, she knows very well how to shower herself.

The White-backed Dipper from Ecuador is accustomed to walk under water, so we had to provide a cage with a bathing pool.

Two More Rare Birds

By LEE S. CRANDALL

ONE OF THE MOST INTRIGUING FEATURES of the maintenance of a large collection of birds is the infinite variety of specializations for innumerable life niches developed in the group. A new specimen is always a challenge, for unless its general requirements are approximated its successful introduction cannot be accomplished.

Among the most curious modifications found among passerine birds are the habits of the Dippers, for these small dwellers among mountains seek their insect and crustacean food beneath the water of highland streams, walking as calmly among the mossy under-surface rocks as a Wood Thrush in his dry land hunting grounds.

Dippers are small birds, no larger than Wood Thrushes, but with long, sturdy legs, strong feet and short, perky tails. They are well distributed, in many forms, throughout mountainous areas of northern Europe and Asia and in western North America. Following the great mountain

ranges, Dippers have found their way through Mexico and Central America as far south as northwestern Argentina.

The Dippers are notoriously difficult in captivity and up to this year no member of the family (Cinclidae) had ever been included in our collections. It was really thrilling, therefore, to find in Charles Cordier's Ecuadorian shipment of last June 19, a White-backed Dipper (*Cinclus leucocephalus leuconotus*), as briefly noted in ANIMAL KINGDOM for July-August. Most of the Dippers are dull gray or brown in color, sometimes with a touch of white at the throat. But in our bird, the dark gray is relieved by white cap, back and breast, all more or less freckled with gray. Found only at the higher elevations, it occurs in western Venezuela, Colombia and Ecuador.

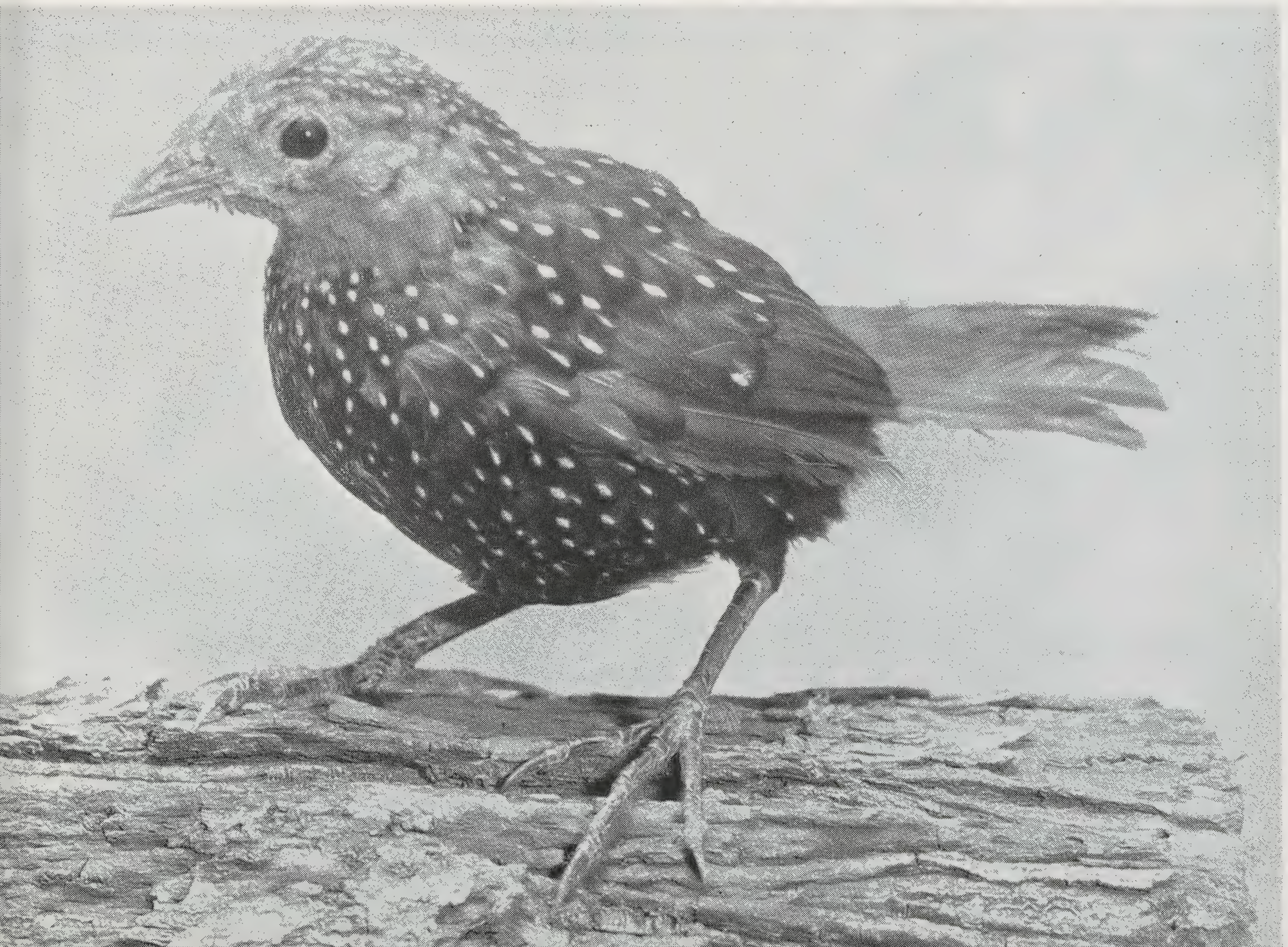
In spite of its aquatic feeding habits, our Dipper has presented no special difficulties, readily taking bits of hard-boiled egg, cottage cheese and scalded meat from a food dish and meal-

A very great rarity is the Ocellated Tapaculo, also from Ecuador — so rare that almost nothing has been reported on its habits.

worms from its keeper's fingers. But its re-introduction to bathing water was a different matter. We knew that if ducks are kept dry for long periods, the plumage loses its power to resist water, quickly becoming saturated and subjecting the bird to risk of pneumonia. We also knew that alternating wet and dry periods, repeated for a few days, will restore the normal resistance of the plumage.

Dippers have a very heavy under-coat of down, with strong, tight contour feathers. Our bird had lived in a dry cage, with no chance for immersion, for some weeks, and his plumage appeared to be in perfect condition. But what would happen when he took his first dip?

There was only one way to find out. We liberated him in a cage containing a pool three inches deep and two feet across. Immediately the Dipper plunged in, splashed a bit and climbed out. A sponge could have held no more, the proverbial drowned rat could have looked no worse. The dry duck system was obviously indicated and for the next week our Dipper was allowed to dip until he was thoroughly saturated and was then returned to his dry cage. At the end of it, his sleek, hard plumage was fit for any mountain torrent and he was liberated in a



planted cage in the Jewel Room. This contains not only rock-work and growing plants but a pool complete with miniature water-fall. And here our Dipper disports daily, splashing in the water and running beneath the fall, as he must have done in the cold streams of the far-off Andes. And as the droplets strike his reconditioned plumage, they roll off as briskly as they would from any duck!

WITH THE SECOND GREAT PASSERINE RARITY in Charles Cordier's Ecuadorian collection of 1952, the difficulty did not lie in habits but rather in names. For the designation Ocellated Tapaculo (*Acropternis orthonyx infuscata*) there is no properly explanatory equivalent. Adaptations of local names for members of this obscure group – "Huet-Huet," "Turco," "Chucao," "Tococo," – convey little of relationships, and the use of the English name "Babbler" is equally confusing, since it has long been preëmpted by an Old World family. So, when we are asked "What *is* a Tapaculo?" we can only reply "A Tapaculo!"

The situation, of course, is not quite so desperate as all that – the trouble is only that in order to be at all understandable, a lengthy explanation is required.

The Tapaculos are an American family (*Rhinocryptidae*) of some forty forms, inhabiting mountainous areas from Costa Rica to northern Patagonia. In the Andes, they may range from sub-tropical foothills to elevations of 12,000 feet. They are ground-haunters, with the short wings and powerful feet best adapted to a terrestrial life.

Only one species, the Galleto or "Little Cock," (*Rhinocrypta lanceolata*), of Argentina and Patagonia, is really well known, even locally. Of this bird W. H. Hudson, in "Birds of La Plata," gives an interesting and amusing account:

"The vernacular name *Gallito,* or 'Little Cock,' by which this species is familiarly known in Patagonia, cannot fail to strike every one who sees the bird as appropriate, for it struts and runs on the ground with tail erect, looking wonderfully like a minute domestic fowl," Hudson says. "In the neighbourhood of Carmen, on the Rio Negro, it is very abundant, and when I went there its loud deep chirrup, heard from every side in the thicket, quickly arrested my attention, just as the perpetual chirping of the Sparrows did when I first landed in England. In the interior of the country it is not nearly so abundant, so that man's presence has probably in some way affected it favourably. Its habits amuse and baffle a person anxious to make its acquaintance; for it scarcely possesses the faculty of flight, and cannot be driven up, but it is so easily alarmed, so swift of foot, and so fond of concealment, that it is most difficult to catch a sight of it. At the same time it is extremely inquisitive, and no sooner does it spy an intruder in the bush than the warning note is sounded, whereupon every bird within hearing hops up into a thick thorn-bush, where it utters every three or four seconds a loud hollow chirp, and at intervals a violent scolding cry, several times repeated. When approached they all scuttle away, masked by the bushes, with amazing swiftness, to take refuge at a distance, where the loud protest is again resumed; but when the pursuer gives up the pursuit in disgust and turns away, they immediately follow him, so that he is perpetually encircled with the same ring of angry sound, moving with him, coming no nearer and never allowing its cause to be seen."

No such record exists of the ways of the Ocellated Tapaculo of the Ecuadorian Andes and our own observations are definitely skimpy. Cordier reports that our specimen was taken at Lloa, a village on the western slope of towering Pichincha, at an elevation of 11,000 feet. About the size of a female Bobwhite, it has the body plumage black, with small white ocelli, while the head, neck and lower back are a bright rust color. The hind claw is straight and elongated, like that of a lark and the base of the bill expands into a broadened plate.

Liberation in a planted cage confirmed the general characteristics of its family. Our Tapaculo instantly sought shelter beneath the foliage, emerging only for food. Later, as its confidence increased, it occasionally climbed clumsily among the lower branches, where it obviously was not fully at home. Insectivorous in feeding habits, it rejected all offers of fruits. In spite of its size and the unusual power of beak and claws, it was entirely inoffensive toward smaller cage-mates.

In these brief notes, our present meagre knowledge of the Ocellated Tapaculo in captivity is summarized. Undoubtedly, much remains for future aviculturists to learn.

This Australian Python Eats Other Snakes

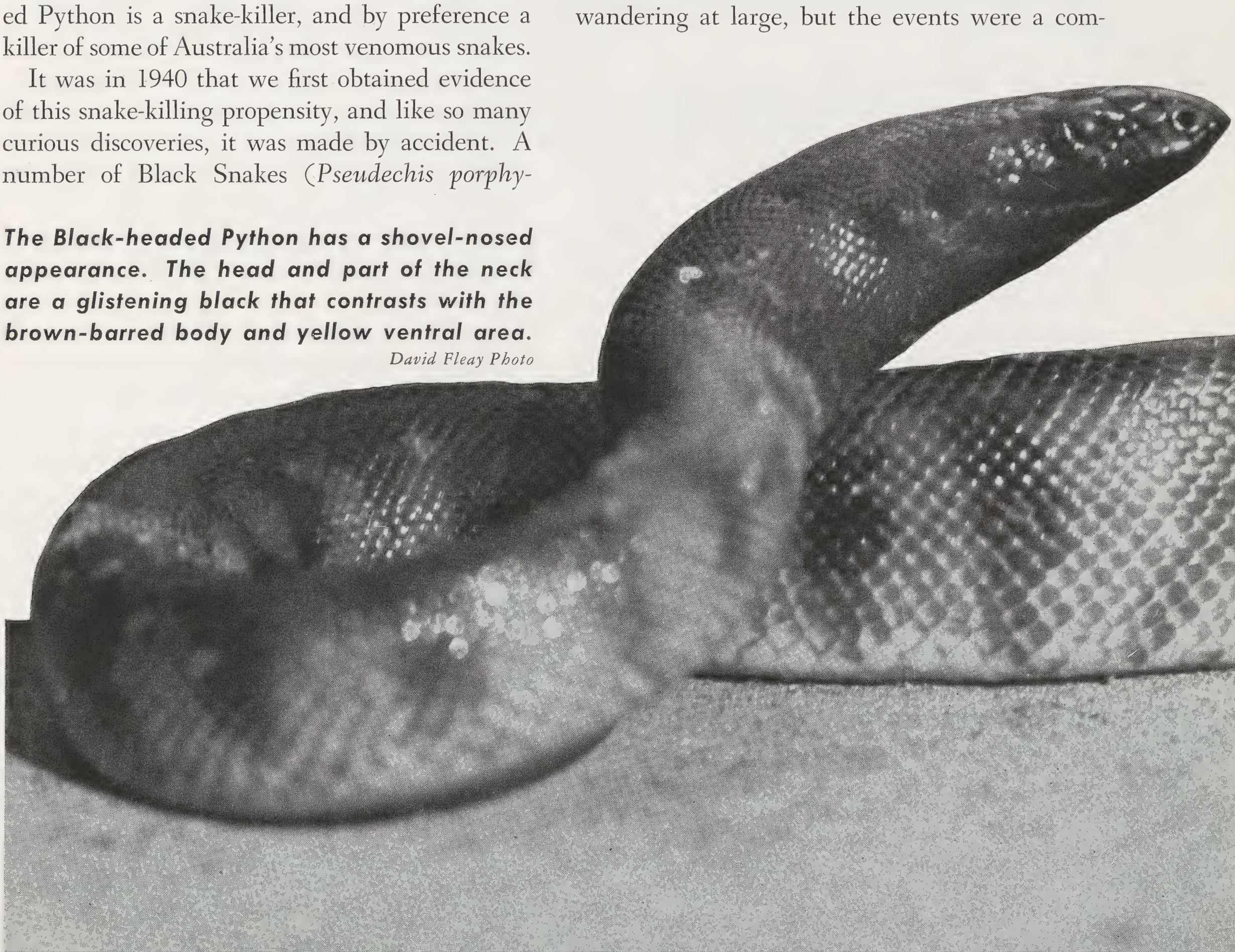
By DAVID FLEAY

THE NAME "python" has a fairly definite meaning for most persons. It conjures up a vision of a large, heavy-bodied snake that throws its coils about a small antelope, a bush pig, a rat, a bird or some other warm-blooded kind of prey, and simply squeezes it to death.

Apart from the fact that most pythons are not particularly large or heavy-bodied, this mental picture is all right. Even so it doesn't tell the full story about the Australian Black-headed Python (*Aspidites melanocephalus*). For the Black-headed Python is a snake-killer, and by preference a killer of some of Australia's most venomous snakes.

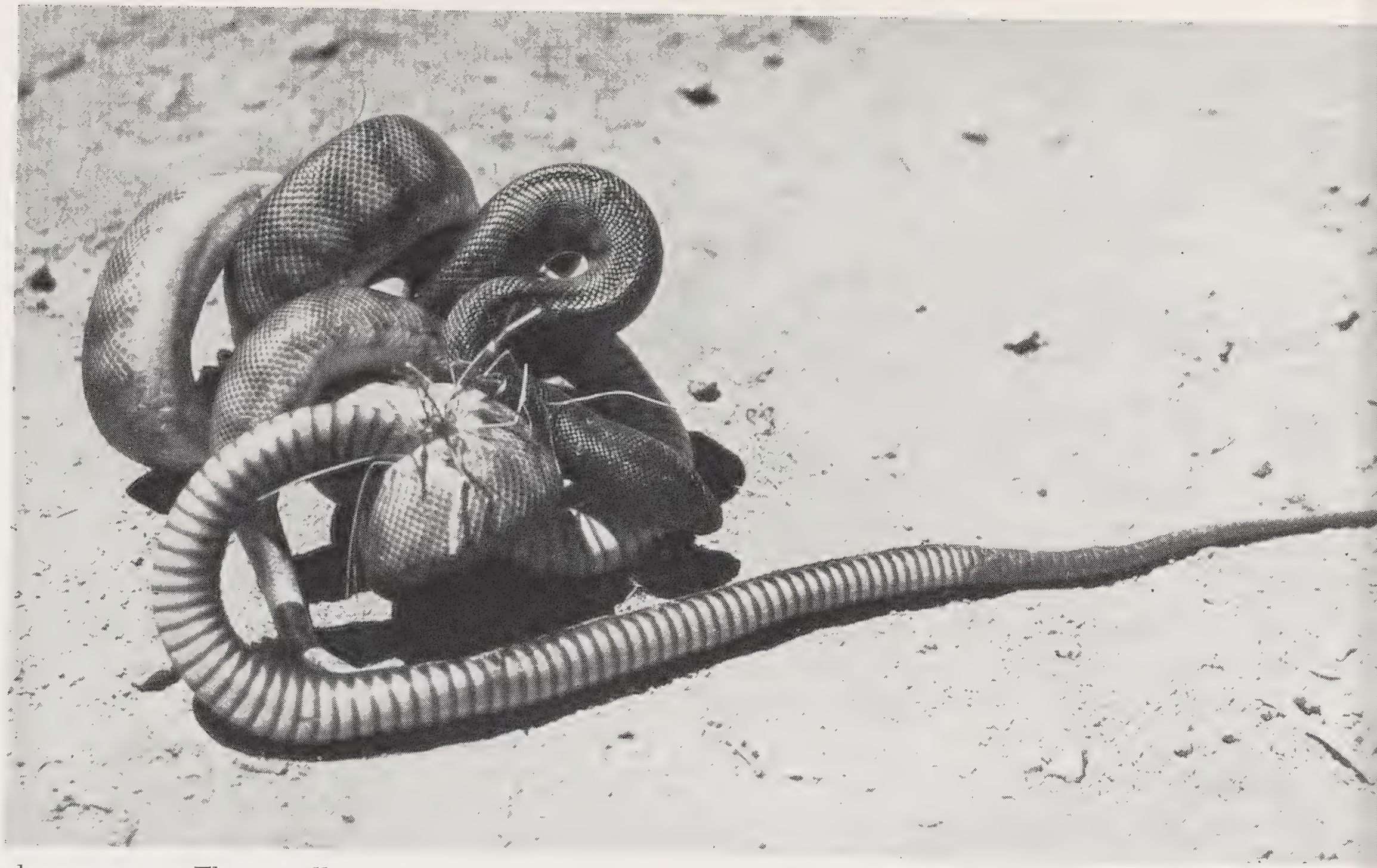
It was in 1940 that we first obtained evidence of this snake-killing propensity, and like so many curious discoveries, it was made by accident. A number of Black Snakes (*Pseudechis porphyriacus*), big and venomous fellows, had been established in winter quarters among plentiful grass hay in a heated house. In the same "dormitory" we were keeping several Carpet Pythons, an Amethyst Python and a 5½-foot Black-headed Python that had arrived from Queensland earlier in the year.

Over a period of several weeks three of the Black Snakes disappeared. An immediate and thorough search was made after each disappearance, for one does not like to have a Black Snake wandering at large, but the events were a com-



The Black-headed Python has a shovel-nosed appearance. The head and part of the neck are a glistening black that contrasts with the brown-barred body and yellow ventral area.

David Fleay Photo



plete mystery. Floor, walls and roof were all solid and snake-proof, and if any of us noticed the plumpness of the sleepy Black-headed Python we made no comment on it, for there was a plentiful supply of rats and we supposed the python was getting perhaps a little more than its share.

But one morning the mystery solved itself quite spectacularly. The Black-headed Python had sloughed its skin the day before, for the third time in six months, and after several weeks of dull coat and milky eyes it was bright and shining again. And active, too — for there was a terrific threshing and twisting in the pile of grass hay where it usually hid. We pulled the grass away and found that the python had encountered one of the remaining Black Snakes and had closed its jaws in a tight grip just behind the Black's head. The victim was writhing and twisting without being able to pull loose, and moment by moment the python caught the struggling body in a new grip of its own coils and immobilized another section of the Black. The struggling snakes were so intent — one on pulling loose, the other in tightening its hold — that they paid no attention when we lifted them up in a bag and carried them out of doors to be photographed.

After the picture-making, when the two snakes were lying on the ground, the Black-headed Python finished the job. Inch by inch it worked its shovel-nosed head around to face the weak but still wriggling Black's head, engulfed the head in one motion, and began to swallow. In less than half an hour from the beginning of the battle, the tip of the Black Snake's tail disappeared and there was nothing to show for it except a series of rippling corrugations in the python's skin.

The swallowing feat was all the more remarkable because the two snakes were of almost the same length.

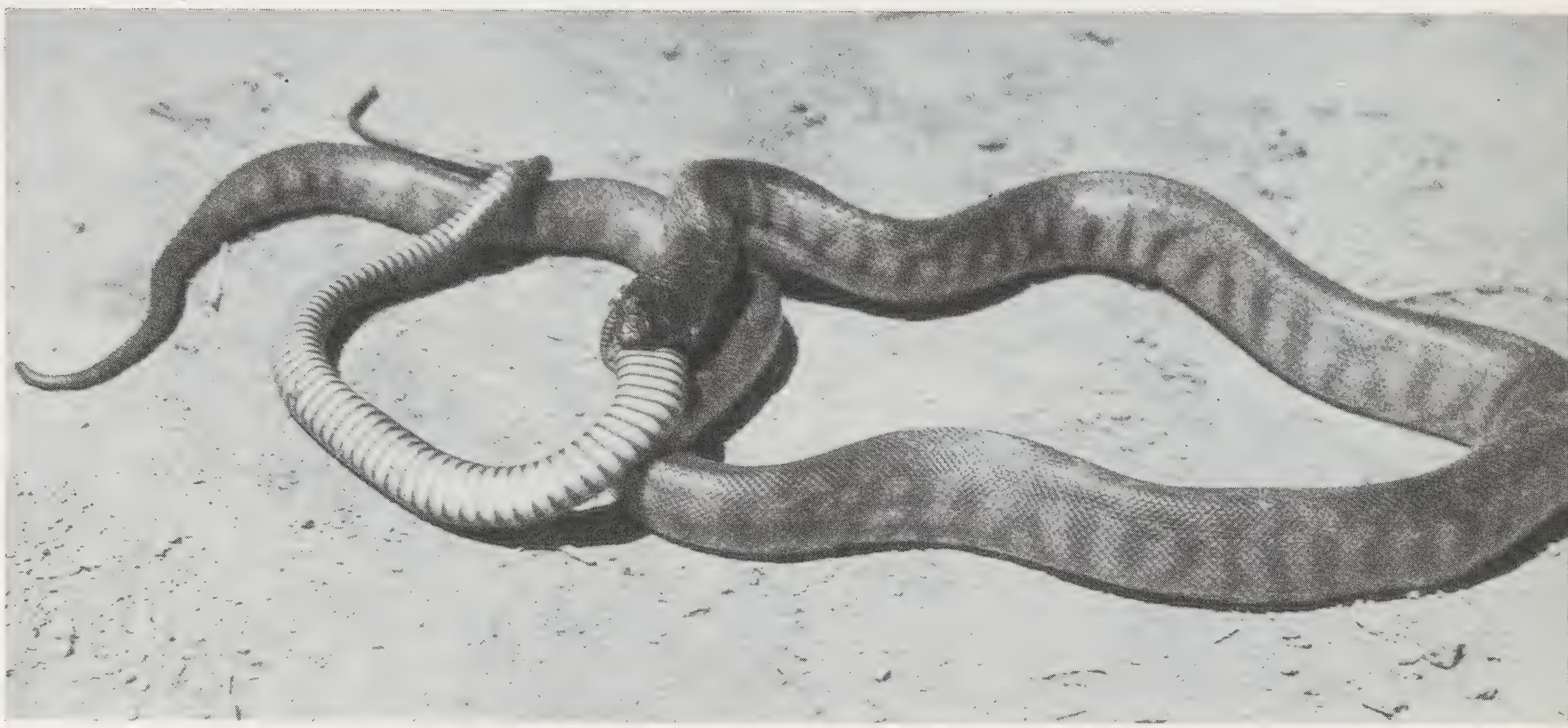
Five days later digestion was complete, but by that time we had removed all venomous snakes of value from the winter storage room so that when the Black-headed Python became hungry again it could not devour our prizes. Black Snakes had cost far too much effort in plodding over the Murray River swamps to be sacrificed to a python's appetite. Thereafter we offered only "second rate" venomous specimens and Copperheads that had been killed on the road, and these only as special delicacies to supplement the staple diet of rats. It was noticeable, however, that the python definitely preferred snakes to warm-blooded prey, and poisonous snakes to small pythons; if both venomous snakes and rats and mice were offered

Here the Black-headed Python has a strangle-hold on a large and venomous Black Snake, and has begun the slow process of swallowing it down.
David Fleay Photo

Little by little, the Black Snake is disappearing—even though it is almost as long as the Python. Half an hour completed the swallowing.
David Fleay Photo

when once it was brought into captivity. Our big fellow was a splendid reptile for demonstration purposes and would permit anyone to handle it. Oddly enough, spectators who were not herpetologically inclined seemed to regard the Black-headed Python with more than the aversion they reserved for other snakes, possibly because its tight, glistening scales and its olive brown to dark brown body color, crossed with darker bands, gave it a sinister, tigerish appearance. The head, too, is rather unusual, being quite small for a python, with a projecting, almost shovel-nosed upper jaw.

The home of the Black-headed Python is far northern Australia and I first made contact with the species in its home country near Townsville,



at the same time, the python turned immediately to the snakes and disregarded the rats and mice.

Bites from such formidable fellows as Tiger Snakes, Copperheads and even Brown Snakes (*Demansia textilis*) bothered it not at all. To my own knowledge, up to 1947 this particular specimen had accounted for more than a hundred venomous snakes—a considerable factor, no doubt, in its attainment of approximate full size of eight feet and in its sleek and healthy condition.

Despite its pugnaciousness where venomous snakes are concerned, the Black-headed Python is temperamentally easy-going in regard to human beings, even exceptionally so. I have never known one to bite or otherwise resent gentle handling

Queensland, in 1939, bringing back from the rocky, knoll-like outcroppings of that area the specimen whose feeding habits were revealed to us as described above. Even before then, the snake had a reputation for possessing a voracious appetite. Heber Longman, the former director of the Queensland Museum, once found a specimen only an inch in diameter that had died because the head of a bustard, or plains turkey, was stuck in its mouth. I hasten to add, however, that the bustard had been shot and the severed head left on the ground, where the little snake found it. Not even a Black-headed Python – an inch-thick juvenile – would (I think) attempt to swallow an entire bustard!

There Are Lessons for Us in

Similarity and Sociability Among Animals

By EDWARD A. ARMSTRONG

We have noted how readily many sociable animals copy each other's behavior.* They have an inborn propensity to do so. This, on the whole, makes for orderliness in the groups and an efficient organization of the individual's life. If, for example, birds are to fly as a flock, it is essential that there should be a measure of unanimity and organization for otherwise chaos would ensue. To a superficial observer a reindeer herd might appear just a moving mass of animals but investigation shows that in such a herd there is a high degree of organization. Even the fowls in our hen-runs have their social order. There is a dominant bird which bullies all the others; and so down the scale to the underling who is pecked by all. The poultry-keeper knows how liable this bird is to become ill and succumb but there is reason to believe that, on the whole, the "peck-order" is advantageous.

Suggestibility, or "mimetic susceptibility" if we prefer a term without human implications, is both an outcome of sociability and a foundation for it. It involves and fosters "fellow-feeling". Among higher animals there are various competitive impulses connected with the securing of adequate food and obtaining a mate which might readily give rise to fighting if they were not modified. This underlying "fellow-feeling" enables such modifications in behavior to arise. For example, there are various birds, such as some ducks, which conduct their courtship in parties, several drakes accompanying one duck. Here is an explosive mixture – sexual desire and male rivalry. We might expect fierce fighting to break out among the birds, on the principle that "none but the brave deserve the fair." In spite of their frenzied excitement, fighting does not occur and no corpses of defeated lovers sully our lakes and rivers. Fighting has become refined into vigorous but harmless jousting. Watch a paddling of red-breasted mergansers in some bay and you will notice several gorgeously adorned drakes swimming around and close to the duck, but instead of striking one another they display as they swim, opening wide their mandibles to reveal bright red mouths and pumping their necks up and down. Eventually one will be accepted by the duck, but no fighting occurs. The birds stimulate each other and courtship has become a kind of gaping competition. It is all much less crude and much more effective than beak-to-beak conflicts

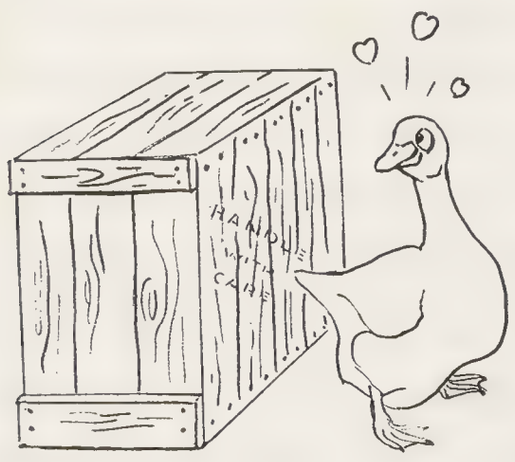
would be because runners-up in these marriage stakes live to woo and win another day. Human beings, too, in all stages of society, have found better ways of securing mates than fighting duels, though competition goes on; in the eyes of the beloved, status, wealth and other such factors play an important part. So the competition for jobs by men may be regarded as, in some respects, the equivalent of the refinement of rivalry among birds into display.

The essential point is that competition in dis-

* See "Behavior Is Contagious, Too", by E. A. Armstrong, in ANIMAL KINGDOM, May-June, 1952.

play takes the place of fighting among many animals. In their excitement birds posturing in a party inspire their companions to display as they do and so the whole group's fellow-feeling is involved. Instead of a mêlée of squabbling individuals the group becomes an orderly unit. Moreover, it seems that we cannot make a clear distinction between such emotions as "anger" and sexual desire so far as birds are concerned, for the attentive observer of such displaying parties of mergansers as I have described, or of oystercatchers and other birds which display in groups, has the impression that the birds are involved in a kind of generalized excitement rather than possessed by an emotion similar to that a human being might feel in comparable circumstances.

It seems certain that acting together increases the vitality and efficiency of individuals as well as contributing to the harmony of the group. Thus the individual coordinates his behavior with that of others in ways which are advantageous to all. The philosopher Hobbes spoke of the solitary life for man as being "nasty, brutish and short," for man is essentially a social animal. Those who have ever camped for some time away from all human society will endorse this, for the craving for companionship can become an ache. Apart from society a chimpanzee is not a real chimpanzee at all, as the psychologist Kohler has said. So great is the craving for company that animals separated from their own kind may form most incongruous associations. A goose may even "make friends" with a packing case and act as if it were another goose.



It is highly probable that the activity of the group may stimulate the individuals to be more active, not only by the direct and "psychological" force of example, but sometimes by bringing about bodily changes which in turn result in alterations in behavior. A few years ago J. T. Emlen and F. W. Lorenz performed an interesting experiment on valley quail, implanting a hormone preparation beneath the skin of some members of the covey. As was expected the effect was to bring the treated birds into breeding condition earlier than usual, but the most significant aspect of the experiment was that the untreated quail, influenced by the pairing-up of their companions, also formed pairs abnormally early. Here we have an example of a change in the behavior of some members of a group being effective in altering the behavior of their companions in such a way as to accelerate breeding. Physiological development was altered through psychological channels.

As long ago as 1890 a naturalist in India noticed that there was a tendency for birds in a colony to be at approximately the same stage in their breeding cycle but at a different stage from the birds of another colony not far away. This observation has now been verified by observers of many other species. To some extent this synchronization within a nesting colony appears to be due to a tendency for the older birds to nest together. The younger birds sometimes have to seek nesting quarters either on the fringes of the main colony or elsewhere. Making allowance for this it still seems that in a big colony birds stimulate each other by their constant activities and that this corporate stimulation may tend to synchronize the breeding of the birds through mutual suggestibility. Synchronized nesting confers various advantages. For instance, such birds as terns which feed on shoaling fish unwittingly indicate to one another as they dive where food is to be found. Thus as long as localized supplies of food are exploitable by a number of birds it is advantageous for many to be able to go to the place where one bird has discovered such supplies.

So important does mutual stimulation seem to be among birds, whether on set displaying grounds or in the nesting colony, that there is reason to believe that if numbers fall below a certain level excitement does not rise sufficiently high for the breeding cycle to take its course. This is difficult to prove but it may be significant that most of the well-known birds which have recently become extinct were highly social – such as passenger pigeons, the heath hen, the Carolina parrakeet and the great auk. The extent of man's depredations on some of these species is notorious;

everyone knows how trains were laden with the carcasses of passenger pigeons in the years of slaughter. Nonetheless, direct destruction by man does not seem adequate as an explanation of the disappearance of these birds. The passenger pigeon was among the most social of all birds. Reports state that in their close-packed roosts they even squatted on top of one another. It is possible that flocks, depleted after man's ravages, were insufficiently large for the birds to stimulate one another to achieve successful breeding.

At all events there is much to show that for many species the advantages of breeding in a large colony outweigh the disadvantages, which are often considerable, for great numbers of birds breeding together render the nesting grounds conspicuous to their enemies, the nesting birds sometimes interfere with each other and may even massacre each other's chicks if they wander from parental care. It appears odd to some of us that human beings who spend their days in crowded cities should choose for their holidays crowded seaside camps, but obviously for these people, too, the advantages outweigh the disadvantages and they enjoy the social stimulation provided. The words of the song express what a great many people feel – "The more we are together the merrier we'll be."

The parallels between animal and human behavior in this matter of community feeling and group stimulation go further. Travellers among primitive peoples have often commented on the corporate solidarity of such communities and, for example, the strange way in which common consent is quickly and tacitly reached after a matter concerning the clan has been discussed. Suggestion, corporate feeling and social stimulation play an important part in these folk's lives. This is true also of the less industrialized communities in Europe. Thus Tomas O'Crohan, in *The Islandman,* describing life on the Blaskets, a tiny isolated group of islands off the west coast of Ireland, says, "It's still the custom on the Blasket – as it always has been – that if any of them start on anything all the rest are eager to follow. Some years the whole island gets married and for seven years after that there won't be a single wedding." On the still more isolated island of St. Kilda, forty-five miles out in the Atlantic from the Outer Hebrides, Martin Martin, writing in 1698 when the population was 180, speaks of the marriage of "fifteen Pair of the Inhabitants on the seventeenth of June, who immediately after their Marriage joined in a Country Dance, with a Bagpipe for their Music, which pleased them exceedingly." Thus on this day one-sixth of the population was married.

These are pictures of the life of flourishing small communities, closely integrated with a vigorous social life in which religious observances, music and dancing all contributed to the general well-being. We have examples of the obverse of the medal also, where social life has fallen into decay and work and play, religion and amusement are not adequately integrated into the social structure. On some of the islands of the South Seas the advent of the white man with his innovations disrupted social life and the population dwindled because corporate life lacked vitality and society was without the "will to live." In 1950 I was on an island in Shetland where practically a whole generation had remained unmarried. The population was about two hundred yet there were only seven children of school age! With the decay of the old culture social life waned and in its decline almost brought society itself on the island to an end. Without the village dance, the harvest festival, community worship, the chaffering of the market, the amusements of the fair-ground, or their equivalents, society disintegrates.

If we observe birds closely we find that their way of life involves a number of forms of behavior which dove-tail with one another to form a pattern. The nature of the food-supply, the character of the pair-bond, the design of the nest, the rôles of the parents in tending the young, are all closely related to one another, and if one of these items in the general pattern is interfered with the whole system of activity may come to grief. With some social birds the company of

others seems to be so important that the behavior of isolated individuals is apt to be abnormal. Man's culture-patterns are also delicately poised systems. To interfere with them is to risk disaster. It has now become the rule among wise conservationists to study a system of animal and plant relationships before interfering with it; so, too, with social reform in human society. An ardor for reform is not enough. The first essential for any reformer is to achieve an understanding of that which he desires to reform. As I have endeavored to show, the sociologist may learn things of value from the ordering of society among ants, birds and beasts.

Our Duckbills Moult by "American Time"

By JOHN P. BLAIR

WHEN AN ANIMAL is brought to the Zoo from the other side of the world, its adaptability to our reversed seasons – winter here and summer there – is ordinarily of interest but of no great practical importance. It is otherwise with our Duck-billed Platypuses from Australia, for we have had some slight hope of creating conditions that will induce them to breed, and it is necessary to make every observation that will tell us whether they are sticking to their natural Australian breeding season of September-October (the Australian spring) or have switched to the actual American springtime. Moulting is one indication, we think, for in Australia they moult *after* the breeding season.

When David Fleay, the Australian naturalist, arrived with our three specimens in April, 1947, he reported that the moulting months in the animals' native habitat vary somewhat with location. In Queensland, Platypuses moult in December and January, while in Victoria they go through the shedding process in January and February. Our specimens came from Victoria.

According to Mr. Fleay, all three had done "some" moulting in January of 1947, yet in August of that year it was noted that Penelope was scratching and preening herself to an unusual degree, both during the exhibition hour and at night. Bits of fur would be seen floating in her swimming tank each morning for a period of almost a month. On the other hand, Betty, the other female, which shared Penelope's quarters, ate the same food and swam in the same tank, gave no indication of similar behavior.

About the time that Penelope completed her moult, bits of fur began to appear in the male's tank and he, too, began to scratch and preen more than usual. His activity continued to about the first of October, thus equalling Penelope in taking about a month to moult.

A record of the moulting periods has been kept, for whatever guidance it can furnish us. It can be summarized as follows:

PENELOPE

	Moult Began	*Moult Ended*
1947	August 8	September 5
1948	August 10	September 10
1949	August 9	September 5
1950	August 5	September 4
1951	August 6	September 15
1952	August 6	

CECIL

1947	September 5	October 1
1948	August 30	September 29
1949	August 14	September 18
1950	August 12	September 16
1951	August 10	September 16
1952	August 11	

BETTY

1947	Did not moult
1948	Partial moult, mid-July

Betty, it will be noted, failed to moult in the year of her arrival, and in 1948 passed through

a short period of scratching in mid-July, which was definitely off-season for either Australia or America. Following this "half-moult" she was off condition and fed lightly, steadily growing weaker until she died on September 6, 1948.

Whether or not the breeding season has changed, the moulting period definitely has. Penelope apparently made the switch completely the first season and has been starting her moult consistently during the first two weeks of August of each year.

Cecil, on the other hand, started a little late and has been moulting earlier and earlier until now he is practically in step with Penelope.

It is of interest to note, too, that practically no shed fur has ever been found inside the hay-filled wooden tunnels, or burrows, where the animals sleep, except on the "squeegees" that are placed across the tunnels to scrape the water from the Platypuses' fur. This indicates that normally – or at least here – the scratching and shedding take place entirely in the water.

News from the Conservation Foundation

Dr. Kingsley Davis Leaves For Africa

Having completed his summer assignment of work on the Population-Resources project, Dr. Kingsley Davis left on October 1 for a two and a half months' field trip in Africa under the auspices of the Carnegie Corporation. The purpose of Dr. Davis' expedition will be to study situations where there is low fertility among non-industrial societies.

Educational Conference at Purdue University

A joint conference of the National Committee on Policies in Conservation Education and the Conservation Foundation was held at Purdue University, Lafayette, Indiana, on September 15-19. The Foundation staff was responsible during the summer for rounding up descriptions of how conservation education can be integrated into various established educational systems, prepared by a wide range of experts in the field. As combined in a 135-page document, these expressions of opinion by conservation education leaders formed the basis of the discussions at the conference.

Ronald Press to Publish Report on Vegetation-Management for Water-Yield Control

Dr. E. A. Colman has finished his year's study of methods of vegetation management for water-yield control, and a contract has been entered into with the Ronald Press for commercial publication of a book by Dr. Colman on this subject. It will be published late in 1953. Dr. Colman will shortly return to the University of California at Berkeley to complete the manuscript.

Alaska Survey Nears Completion

Last May Drs. F. Fraser Darling and Starker Leopold went to Alaska in a joint project of the Conservation Foundation and the New York Zoological Society for the purpose of studying the long-range effects of environmental changes on the Caribou and Moose populations as well as making first-hand observations of other wildlife protection problems. The report of this research is expected to be completed by the end of the year. A number of interesting photographs of the field work have been received.

So far, one of the general conclusions reached is that in many areas Moose will increase, whereas

Caribou populations can do no more than hold their own with little or no chance of gain. The field work is covering most of Alaska, including three trips to Barrow. In one area of some 24,000 square miles, the investigators saw no ground elevation of more than three feet, and on these lilliputian "hills" they found substantial vegetational change between "base" and "apex."

A paper on the subject of certain aspects of the field work was delivered at the Alaska Science Congress at Mt. McKinley Park in mid-September.

Marine Resource Study

A substantial part of the Marine Resource report will be received by the first week in October. Dr. L. A. Walford, who is directing the work, expects to complete the study early in 1953.

"Salt-to-Fresh Water" Report Soon Ready for Release

The study of techniques of converting salt water to fresh water being conducted by the Nuclear Development Associates under the Foundation's direction is reaching final form and the report of this work is due this autumn. Present indications are that, despite newspaper reports to the contrary, there is no immediate prospect of obtaining large amounts of fresh water from salt water at prices that would be economically practicable.

BEHIND THE SCENES

NEWS AND NOTES OF THE ZOOLOGICAL PARK, THE AQUARIUM AND THE DEPARTMENT OF TROPICAL RESEARCH

The Cubs Are Growing Fast

September weights of the four Tiger cubs, born on May 1, indicate that they are growing rapidly. Sira and Gingi, the two females, weigh 42 and 35 pounds, respectively, and the two males are even heavier — Wadi, 44 pounds; Souja, 45 pounds. There is no mystery about their growth: they get about four pounds of horsemeat a day, and ordinarily consume it all. The cubs were removed from their mother, Dacca, in mid-August.

* * *

Two pairs of Blackfoot X Humboldt Penguins in the Penguin Pool have laid eggs and are incubating them. They should hatch early in October.

* * *

Our Old Okapi Is Gone

Our old Okapi, the first one in the United States and the only one until we received a second male specimen from the Cordier expedition in 1949, has been increasingly crippled by arthritis and finally had to be destroyed on September 5. At the time of its arrival on August 3, 1937, it was believed to have been born in the fall of 1935, which would make it about 17 years old, and with a life span in the Zoological Park of nearly fifteen years.

An Okapi in the Rotterdam Zoo holds the longevity record, having lived for more than 16 years in that zoo.

Wilson's Bird of Paradise Is on Exhibition

A male Wilson's Bird of Paradise, the first we have exhibited since 1926, came into the collection at the end of August. It is one of the most beautiful of the smaller Birds of Paradise.

Small but heavy-bodied, it is about the size of a Starling. It has an electric-blue patch of bare skin on top of its head, a glistening green breast-shield, a bright yellow patch on its upper back, and a deep red back. Two curled, ornamental plumes project from the tail.

The bird came to us from Rotterdam Zoo on August 29 and went on exhibition on September

8. It is shy and nervous, but seems to be settling down well.

Currently the accepted name for Wilson's Bird of Paradise is *Diphyllodes respublica* (Bonaparte), and the name actually has more history than the bird. Little is known about the species except that it is apparently confined to the islands of Waigeu and Batanta off the coast of

Wilson's Bird of Paradise

New Guinea, and lives in the lowlands near the sea. Prince Bonaparte, nephew of Napoleon and a celebrated ornithologist in his day, happened to see a skin of the bird which had been purchased in Europe and was on its way to the Academy of Natural Sciences of Philadelphia. The Prince was so charmed by it that he talked about it before the Academy of Sciences in Paris in 1849 — in the midst of a discussion of parrots — and bestowed a technical name on it. Bonaparte called the species *respublica* for the new Republic of France, although as he commented somewhat bitterly, the ambitions of the republicans in France were making the Republic a hell instead of a paradise.

Subsequently the skin arrived in Philadelphia and was named for Edward Wilson, who had obtained the skin in Europe — the Philadelphians not knowing that Bonaparte had already given it a name.

There was still another naming by an ornithologist who obtained his specimen in its native home, each worker being unaware of previous work, and the taxonomy has a long and involved history. Today Bonaparte's scientific name is accepted, although the common name after Wilson is generally used.

Little Fish

(*Continued from Page* 150)

I tested the water in which they lived and found that it was 76° F. The temperature in the guest house often was 90° F.; outside it was close to 100° F., sometimes more than that.

I placed the glass covered jar in the shower stall, covered it with a cloth and turned the faucet so that a constant drip of water kept the cloth wet. The evaporation process cooled the cloth and this coolness air-conditioned the fruit-jar home of the swordtails. They, together with other live fish collections made along the northern coastal plains of Honduras as far east as Belfate, were flown successfully to our laboratory in New York.

I was unable to find platyfish in Honduras and this convinces me that this species' southernmost habitat must lie somewhere north of the Honduras - Guatemala border. As the records stand now, this expedition of the New York Aquarium, and those made in previous years, have established the northern and southern world limits of the platyfish and swordtail. For the platyfish the southern limit is the Belize River in British Honduras. For the swordtail it is about 20 miles east of Ceiba in Honduras, but the fish may reach Nicaragua. The swordtail is not only found further south than the platyfish, but also further north, for we caught them in the Río Nautla in Mexico. The northernmost limits of the platyfish is the Río Jamapa in the same country.

It is now about a year since the Honduran swordtails were taken from their jungle streams for study in the Genetics Laboratory. They have thrived. Their young have borne young of their own.

This is what we have found out about the rare spotted swordtail so far. The large black pigment cells are inherited through a dominant gene, but unlike the potentially cancerous black cells of the platyfish, those of the swordtail are models of good behavior.

Our tests are by no means over. If we find that the large black pigment cell of the swordtail retains its normal habit of growth under a variety of conditions, we will then have a "standard cell" with which to compare the apparently similar but dangerous pigment cell of the platyfish. This gives focus to the point that two cells may look alike but may differ greatly in their potentialities for good or evil. Our job is to determine what part heredity plays in influencing the vital and irrevocable changes that take place when apparently normal cells become cancerous ones. The scientific news is getting around that there is no better living tool for the study of the underlying causes of black cancers than the swordtails and platyfishes.

PUBLICATIONS OF INTEREST

KING SOLOMON'S RING. By Konrad Z. Lorenz. With a foreword by Julian Huxley and sketches by the author. Pp. xix + 202. Thomas Y. Crowell Co., N. Y., 1952. Price $3.50.

When "Der Kumpan in der Umwelt des Vogels" (The Companion in the Bird World) appeared in 1935, its author, Dr. Konrad Lorenz, was immediately recognized as a new leader in the field of animal behavior. Stemming from his impetus and stimulated by a lecture illustrated with films depicting his now famous Gray-lag Geese, given before the International Ornithological Congress at Rouen in 1938, a whole new school of naturalistic behavior researchers has arisen. Even English translations of Dr. Lorenz's works are not easily assimilated and are far from the order of fireside reading.

That the man who wrote "The Companion in the Bird World" could also have written a book so completely charming, revealing and informative as "King Solomon's Ring" is almost incredible. The explanation of this apparent paradox is found in the reading. Dr. Lorenz has a deep feeling for animals as such and his scientific explorations of their natures has sprung from this underlying foundation.

The result is a book that gives full rein to the varied indulgences of a lover of animals, allows for a certain amount of sentimentality and introduces, throughout, so much factual and interpretive material as to avoid the common pitfalls of anthropomorphism.

This latter point does seem to require further elaboration here. In present-day behavioristic thinking, the fear of anthropomorphism has raised an almost insurmountable barrier to progress. The interpretations of Lorenz push these barriers so far beyond our generally accepted horizons that they open entirely new fields to those who accept them. One of the great difficulties lies in paucity of terms and the use of "husband" and "wife" has implications abhorrent to those who hew close to the line. It is necessary to read the book through attentively to make certain that the use of such words is fully understood from the viewpoint of Lorenz.

The book is replete with humor and really delightful descriptions of innumerable incidents. The assistant who inadvertently addressed "goose talk" to ducklings and automatically begged their pardons and the author's aged father whose invited guests, a flock of Gray-lag Geese, indiscreetly spotted the rug beyond recall, provide anecdotal material of special excellence.

The early chapters of the book are really introductory, since they build up slowly to an intricate account of a colony of Jackdaws, the real heart of the matter. Descriptions of the behavior of fishes are fascinating, even though aquarium experts may take exception to Dr. Lorenz's explanation of the factors of "balance." The chapter on Shrews is a really useful contribution to the ways of these little known animals. The advice given in "Buying Animals" certainly will not receive general approval but under the heading, "The Covenant," will be found a dissertation on the nature of the dog, so discriminating and so incisive that it will satisfy the most demanding, whether or not he accepts the author's statements concerning breed origins.

"King Solomon's Ring" does, indeed, shed "New Light on Animal Ways." Most of all and for the first time, it presents in assimilable and authentic form, the fruits of extensive research in animal behavior. L.S.C.

WANDERING ALBATROSS. Adventures among the Albatrosses and Petrels in the Southern Ocean. By L. Harrison Matthews. Illustrated by line drawings and 21 photographs by the author. 131 + x pp. MacGibbon and Kee with Reinhardt and Evans, London, 1951. $3.

At first glance, Wandering Albatross appears to be a salty and rollicking account of adventures aboard a sealing vessel in the southern seas. But little reading is required for the discovery that this mildly ribald mask is a thin disguise for a really fascinating account of the little-known sea birds of that area, with special attention to those of South Georgia. The habits of Albatrosses, Petrels, Sheath-bills, Skuas and even the Gentoo Penguin are described with the sympathetic interest one expects from the Scientific Director of the London Zoo. Interpolated accounts of the sealer's crew give a sense of realism too often lacking in books of natural history.

—L.S.C.

SPIKE: The Story of a Whitetail Deer. By Robert M. McClung, 64 pp., illus. by author. William Morrow & Co., New York, 1952. $2.00.

A few yards from the Administration Building of the Bronx Zoo there is a flourishing herd of white-tail deer which annually produces a dozen or so fawns. Mr. McClung, the author of "Spike: the Story of a Whitetail Deer," is Acting Curator of Mammals and Birds at the Zoological Park, and the fawns, does and bucks of the Zoo herd are under his charge. He is not, therefore, writing about the lives of such creatures merely as one who has dredged his facts from books. "Spike" is a simple story of the little and big adventures in the life of a white-tail fawn from the spring of its birth to the following spring when, as a spike buck, or yearling, it begins life on its own. A rattlesnake, hunters, a forest fire, are the only excitements and they are not overly-dramatized. The story is quiet, balanced, accurate and informative, well calculated to interest a small child and a worthy companion to Mr. McClung's other books on a Chipmunk, a Sphinx Moth and a Ruby-throat Hummingbird.

OUR AMAZING BIRDS. By Robert S. Lemmon. 102 illus. in black-and-white by Don R. Eckelberry. 239 pp. The American Garden Guild and Doubleday & Co., Inc., Garden City, N. Y., 1952. $3.95.

In this group of brief essays, Mr. Lemmon has outlined the life histories of 99 species of contemporary native American birds, as well as three others – the Great Auk, the Passenger Pigeon and the Carolina Parrakeet – which have already passed into extinction. The essays are well done in popular and readable style and will be most stimulating to casual or budding interests in bird lore. Mr. Eckelberry's drawings are very good indeed, and add much to this attractive volume. It is no aspersion of the artist's skill to suggest the probability that few male Ruby-throats enjoy such close inspection of their offspring as the bird shown in the frontispiece. – L.S.C.

BIRDS AND THEIR NESTS. By Olive L. Earle. 64 pp., illus. by author. William Morrow & Co., New York, 1952. $2.00.

Somewhat older children will like Miss Earle's "Birds and Their Nests" and if children use reference books, this is an excellent one for the child's library. The nests and nesting habits and some of the more usually sought information about 42 birds is set down concisely, alongside Miss Earle's drawings of the birds and their nests. Without attempting to be a guide or identification manual for nests – there are several such books – it covers quite a number of the unusual nests of native and foreign birds, including the Giant Oriole, or Oropendola; the Hoatzin and the King Penguin – the latter not a nest-builder at all, but certainly unusual enough to be included, for it incubates its egg by carrying it on top of its feet, covered by a fold of skin.

FRESHWATER TROPICAL AQUARIUM FISHES. By G. F. Hervey & Jack Hems. Pp. xiv + 425, illus. Published by Batchworth Press Ltd., London, 1952. British Book Center, New York, $8.50.

Small aquarium fishes are still increasing in popularity, and with this increase goes an increased demand for information about them.

The most recent attempt to supply this information is an ambitious work from England, where there seem to be more fanciers, proportionately, than there are here.

The authors have considerable practical knowledge of fish-keeping, which they manage to convey very well, and some experience with a great many species – apparently not all that are treated in the book, some five hundred odd – which they are willing to share, and their discussions of tank management, fish sicknesses, plants and other tank furnishings, and even salt water tanks, are satisfactory from a practical standpoint. Their knowledge of the theory behind the operation of the fish tank, their taxonomy, and even of such commonplaces, nowadays, as the use of the new drugs for the treatment of disease, is not quite as sound.

As a contribution to the lay literature, however, the book is definitely important.

There are adequate indices, but the illustrations are poor, not up to what we had learned to expect from their previous efforts on goldfish. – C.W.C.

THE DUSKY-FOOTED WOOD RAT. By Jean M. Linsdale and Lloyd P. Tevis, Jr. Numerous photographs, charts and tables. Pp. vii + 664. University of California Press, Berkeley and Los Angeles, 1951. Price $7.50.

In this weighty volume are set forth the results of ten years of observation of the ways of this small rodent. Besides the authors, a total of twenty-one other workers at the Hastings Natural History Reservation of the University of California have contributed data of one sort or another.

Technical in content, the book is not noteworthy for readability. Both data and photographs are extensive and sometimes repetitious but the contents in general will be invaluable to workers with this species, in any aspect. Factually, there must remain little more to be said concerning the Dusky-footed Wood Rat. – L.S.C.

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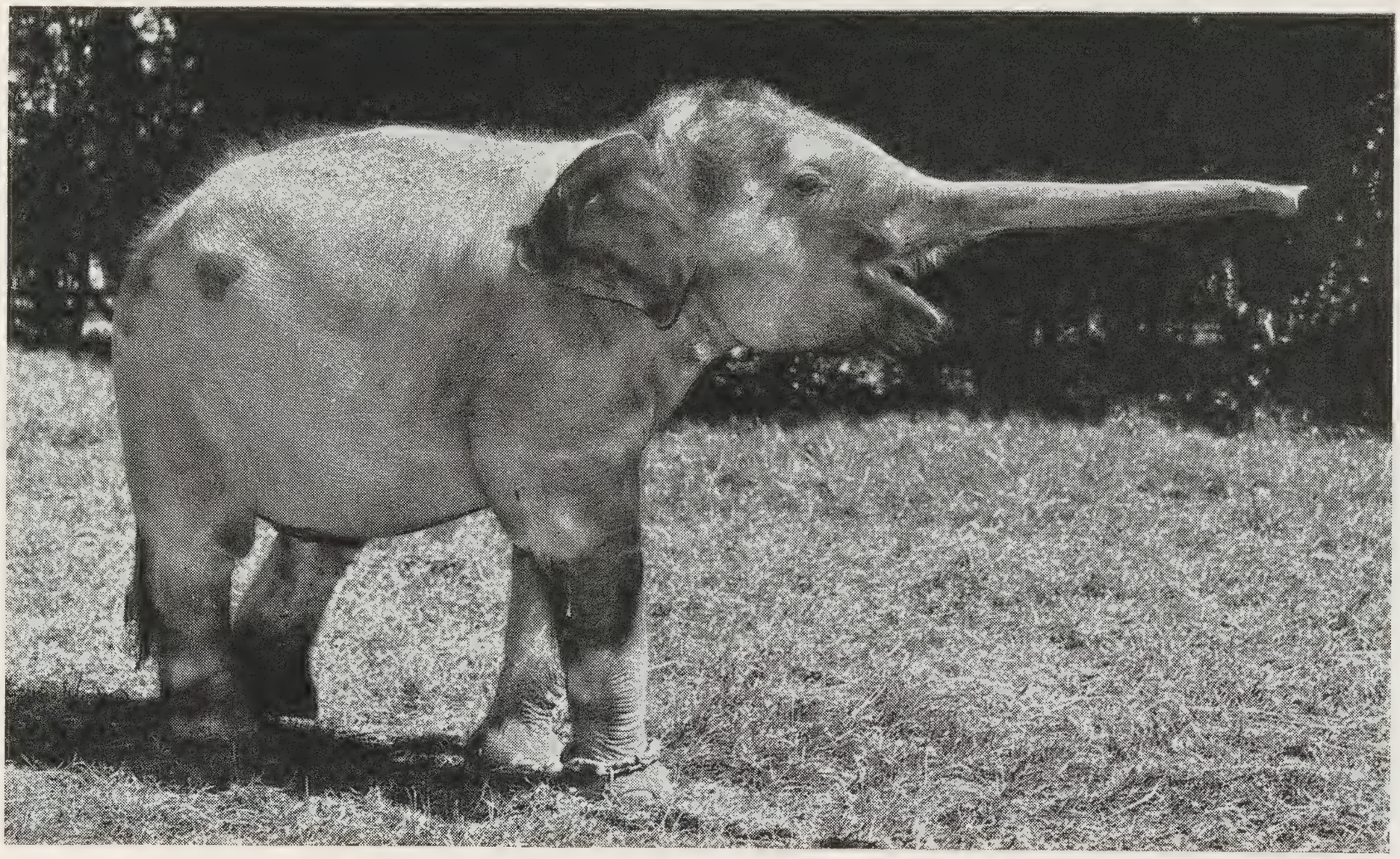

CANDY

Goes Right After What She Wants

Our new baby Elephant, Candy, is a direct actionist. She is only a little over a year old, but already she has learned to stick her infant trunk straight out for refreshments — just like a big Elephant.

Sometimes we wish *we* had an appealing proboscis like Candy's. We would use it to plead for new members for the Zoological Society. Perhaps in time we can train Candy to beg you for the names and addresses of those friends of yours who ought to join the Society.

Smart as she is, we think it will take some time for Candy to graduate from cadging for popcorn to this higher form of salesmanship. So in the meanwhile, won't you please use the card enclosed with this magazine to send us some names? Candy has enough charm to beguile many more people, so come to see her soon.

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ANIMAL KINGDOM

Bulletin of the

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The Promise of a Great Event

THESE FEW LINES are merely to report "stirrings and imaginings" and the promise of a great event ahead. Shortly after this reaches the members and friends of our Society a public announcement will appear that we are going forward with plans to bring the new Aquarium into reality. The next issue of this magazine will be devoted entirely to that great project and the steps that need to be taken to carry it through.

When realized it will transport the life of the oceans and waters of the world – indeed the epic of "the sea around us" – into the intimate ken of the people of the City, of the nation and of all who come from far places.

Fairfield Osborn

DEC 15 1952

TWO BIOLOGISTS TAKE A LOOK AT

What's Happening in Alaska

BY DR. F. FRASER DARLING
Ecologist and Member of the United Kingdom Nature Conservancy

&

BY DR. A. STARKER LEOPOLD
Assistant Professor of Zoology, University of California

DURING THE past few years our institution has had a strong urge to try to do a job that would prove a contribution to the protection of wildlife in Alaska. We have recognized, of course, that many agencies, government and otherwise, were engaged in the problem but we nevertheless continued to believe that there were some significant things that our Society might accomplish.

It so happened that last year The Conservation Foundation – a close affiliate of the Society, as all our members know – was requested by the Secretary of the Interior to make a study of Alaska's resources and prepare recommendations for their orderly planning and development. This report, entitled "Alaska Program Analysis," was completed in February of this year. All the while our Society was impatient to make an intensive study of wildlife conditions per se. Consequently, in collaboration with the Foundation, and with funds provided by both organizations, careful and thorough plans were prepared for an intensive study. We were fortunate in securing the interest and services of two exceptionally qualified people – A. Starker Leopold of the University of California and Frank Fraser Darling, the well-known British naturalist and ecologist. These two men arrived in Alaska on June 1 and spent more than three and one-half months there. Cooperative arrangements were made with the University of Alaska, which acted as a co-sponsor, and with various governmental services in the Territory. The aid that our representatives received in every quarter is beyond telling, including permission to fly on military plane missions which carried them the length and breadth of the vast Territory, which in size is equal to one-fifth of the entire United States.

Naturally a great number of observations were made, including some of unusual interest – such as the consequences of forest destruction, of over-grazing and of the disadvantages of some of the existing practices that are aimed at the extermination of wolves. A complete report is in preparation and will be available within the next few months to our members who wish it. Further, a book for general reading is being written by Dr. Darling, which will relate some of the more striking of his experiences. In the meanwhile, the article that follows will convey a few of the observations that were made. – FAIRFIELD OSBORN

THE MOOSE occupies a habitat of wet forest edge, or tundra with expanses of willows in the draws. It achieves highest density in forest areas that have been opened by fire or any other form of timber removal, permitting regeneration of willow, birch or aspen.

The quality of winter range, which in the final analysis determines population density, is a direct function of the amount of young willow, birch or aspen existing above the surface of the snow. These critical browse plants are characteristic of *secondary* stages of vegetational succession, and the moose itself may thus be considered an animal of a sub-climax biota.

Conversely, the caribou seems to require a winter range well supplied with various fruticose

lichens which are part of the *climax* flora of forest border (taiga) and to a lesser extent of tundra. Like the moose, caribou wander into many types of country in spring, summer and autumn, from coastal low tundra to high glacial valleys, but all winter ranges examined by us contained in the ground cover a fair amount of climax lichen growth which supplies an appreciable, and seemingly indispensable, part of the winter caribou diet. The caribou, then, may be looked upon as a member of a climax biota.

[Moose and caribou habitats do overlap, but by and large the species are kept separate by differences in vegetation. Consequently, changes in the climax ground cover may affect moose and caribou quite differently, and the arrival of the white man has brought about many changes – the most important being fire].

An astonishingly large proportion of the lowlands of central and southern Alaska has been burned in the last half-century. It is obvious to the traveller that perhaps half or locally much more than half of the taiga has been burned in the immediate past. H. J. Lutz estimates that 80 per cent. of the white spruce has been burned in the past half-century.

The quickened rhythm of fire has in general favored the extension of willow-birch-aspen, and concomitantly reduced the original stands of lichen. Such a condition has encouraged the spread and local increase of moose, at the same time eliminating or greatly reducing the winter range usable to caribou.

A second major range influence which has materially circumscribed the area occupied by caribou has been the introduction of reindeer in the western coastal regions of Alaska and locally in the interior. From 1892 to 1932 the reindeer herds increased and occupied most of the coast from the Colville delta on the Arctic Ocean westward and southward to Lake Iliamna at the base

Our investigators of Alaskan fauna found that "there is good reason to think that moose will continue to increase as new winter ranges are created." These magnificent animals are part of a Museum habitat group.

American Museum of Natural History Photo

of the Alaskan peninsula. The total number of reindeer at the peak may have been over 600,000. Lack of adequate knowledge of range limitations and poor herding practices (repeated heavy grazing of local areas of range) led to exhaustion of the lichens and wholesale losses among the reindeer herds. The count in 1938 when the Government decided to take over the reindeer from private interests was 252,000 animals. Numbers had sunk to 155,000 in 1941. There remain only 26,735 reindeer in 1952, according to figures supplied us by the Alaska Native Service.

[Predation by wolves and absorption of reindeer by caribou herds have been blamed, in part, for the reindeer decline. However, the same pattern has been followed on islands where there are neither wolves nor caribou, and the investigators found signs of over-grazing on these islands; the lichens are virtually gone. "In short, where reindeer have grazed heavily, the range has been damaged and in many localities made untenable for both reindeer and caribou. On these grounds alone one can account for the disappearance of caribou in most of western Alaska and in such isolated portions of former reindeer range as the base of the Alaska peninsula."

[The break-up of the climax caribou range into small, isolated pieces may have had a bad effect on the reproduction of the animals, quite apart from the loss of total habitat area. "We have come to question whether the thrift and productivity of small herds, confined to isolated ranges, may be appreciably less than in nomadic bands wandering free over large ranges."]

There is one other factor which may be furthering the spread of moose northward and tending to restrict the caribou on the southern ranges, one not caused by man, namely, the general, slight, Holarctic warming which recorded meteorological observations over the last century show to be taking place. We know, also, that the retreat of the glaciers has in some places removed an actual physical barrier to moose. This slow, possibly temporary, climate change has worked in the same general direction as have the disturbances caused by man and has probably increased the pace of population change. The increase of moose north of the Brooks Range, and locally in areas of retreating glaciers in southern Alaska, may be entirely due to this climatic factor.

To summarize the discussion of range influence: changes in vegetation resulting from white occupation of Alaska have on the whole acted for moose and against caribou. The population trends of the two species correlate closely with the changes in range. Climatic trends may have accentuated these effects.

Caribou seem destined to decline in numbers as their habitat is cut over and settlement advances.

Chatelain — Fish & Wildlife Service

Reindeer have played an im tant part in destruction of bou habitat. They declined,

Higgins — National Audubon S

Hunting at a greatly accelerated rate has been another impact of white penetration in Alaska. Uncontrolled killing of big game was probably worst in the period of the widely dispersed trapper-prospector population. This was also the period when native Indians and Eskimos obtained

general access to modern firearms and ammunition. For many years both moose and caribou were indiscriminately overshot, without effective government restraint. More recently, trapping and prospecting have both declined from the style they formerly followed, and the attitude of most Alaskans has changed to one of desiring to conserve big game herds instead of merely to exploit them. Furthermore, the extension of the work of the Fish and Wildlife Service has had an immense effect on ordering and codifying the situation. In much of southern and central Alaska it is our impression that the hunting kill has been reduced to less than annual increment, hence that hunting has ceased to be the prime limiting factor on big game numbers that it recently was. The general increase of moose is

prima facie evidence of the growing success of the game protective program. That the caribou are not responding equally seems attributable largely to range limitations.

By the same token, one has difficulty explaining current population changes on the basis of wolf predation. There can be little doubt, it seems, that wolves were increasing in recent years over much of Alaska until the vigorous control program of the Fish and Wildlife Service was initiated, and now the trend is reversed. Through this era of rise and then decline of wolf numbers, the trends in moose and caribou population have been surprisingly constant – the former increasing, the latter decreasing south of the Arctic circle. The considerable increase of moose in the Colville River Valley, for example, occurred in the face of rising wolf numbers. So also did the more gradual spread of moose in the Yukon Valley and on the Alaska peninsula commence before wolf control began. And conversely, the decrease of caribou has not been checked by wolf control except in one herd, the Nelchina, which has shown a sharp recovery in the past three years. All other remnant herds in central and southern Alaska are merely holding their own or slowly decreasing despite wolf removal.

We wish to make it clear that we are not filing a blanket objection to predator control as a legitimate tool of game management. There are indeed situations where wolf removal may be highly beneficial in restoring depleted breeding herds of moose or caribou on ranges which can carry more animals. The case of the Nelchina caribou herd may represent just such a situation.

But in each case where an increase in breeding stock is deemed an immediate objective of management, it should be established in advance that the range will support more animals. It has been the history of big game management throughout North America that range limitations usually are recognized and defined *after* excess breeding stocks are created by overzealous protective measures. We cannot afford to repeat that error on Alaskan caribou ranges which are so highly sensitive to overgrazing, as shown by the reindeer experiment.

As for the caribou herds north of the Arctic circle in Alaska, we question seriously whether there has been any decrease in the last half-century. Many herds, numbering in the thousands, have been seen in the past five years on ground where explorers who covered most of the Brooks Range and Arctic plain in the early 1900's spoke of scattered hundreds. Our observations on the influence of caribou on Arctic ranges lead us to say without hesitation that the tundra is in reality a highly sensitive lichen range very much inferior to the taiga range, with relatively low productivity and slow capacity for recovery. There are more caribou in the north now than for many years past, and it is by no means established that the country can carry in perpetuity even the present population, let alone an increased number. Therefore, efforts to increase the northern herds by control of wolves may well be a dangerous policy unless human hunting pressure is adequate. If this brittle climax range is damaged by overgrazing, the caribou population might well crash and the resource be lost. At the moment, no such overpopulations are recognized in the caribou herds of Alaska, but who among us would recognize them? Until we know more precisely how to measure carrying capacity of tundra caribou range, we had better elect deliberately to understock rather than risk overstocking, particularly in the northern regions where hunting on the whole is now light.

There is good reason to think that moose will continue to increase and spread as new winter ranges are created by removal of the spruce forest. As far as we can see at the moment, there is perhaps no better use for much of the poorer forest land than to be moose range, so managed as to sustain a maximum number without endangering the range.

The prospects for caribou are not nearly so good. Caribou, depending upon a climax vegetation, will probably continue to diminish in numbers as their range shrinks with further human encroachment and disturbance.

It is almost inevitable that after occupation of a country by technological, pastoral or agricultural man, we find ourselves struggling to *preserve* the animals of ecological climax status, such as bison, musk-ox and caribou. The opportunity to *manage* and produce game lies largely in populations of those animals which reach maximum abundance at stages of sub-climax or secondary succession, such as deer, elk and moose.

From this West Indian sea cucumber a substance called "Holothurin" is being extracted for study.
Lester R. Aronson Photo

Beneficent Poison From the Sea?

BY JAMES W. ATZ
Assistant Curator, New York Aquarium

IT IS HARD TO BELIEVE that any creature as unprepossessing as a sea cucumber could ever be a benefactor of man, but that is what one West Indian species gives promise of becoming under the guidance of Dr. Nigrelli, the Aquarium's Pathologist, and other zoologists, biochemists and pharmacologists. Sea cucumbers generally have been neglected by scientists and laymen alike. Until just a few months ago, no one except the very few sea cucumber "experts" would have dreamed of calling them exciting or promising animals for laboratory and medical research.

At that time Dr. Nigrelli took a month's leave of absence from his duties at the Aquarium and flew down to the island of Bimini in the British West Indies, sixty miles due east of Miami. There on the edge of the Gulf Stream, amidst the rich West Indian marine fauna, the American Museum of Natural History maintains the Lerner Marine Laboratory. Dr. Nigrelli had been a guest at the laboratory on two previous occasions, and he had three or four scientific problems on his agenda, one of which concerned the sea cucumber that is locally abundant in waters surrounding the island.

This species, whose scientific name is *Actinopyga agassizi,* exhibits the typical sea cucumber appearance and demeanor – that is, it looks and acts like a not-too-animated sausage. Numbers of these dark brown or reddish creatures can be seen through the crystal clear Bimini waters, very slowly moving about on white coral sand banks not far from the laboratory. Large specimens may be fifteen inches long with a diameter of five or more inches. The first time you handle one of them you receive the impression of an overgrown

sock packed with mud, or perhaps a large, water-logged loaf of brown bread. Soon, however, you become aware of the strong muscles in the animal's body wall and perhaps you can feel the hundreds of tiny tube-feet by which it ordinarily moves along the bottom. These are hydraulically operated through a complicated water vascular system consisting of innumerable canals, sacs and valves. For although the sea cucumber may look rather simply put together from the outside, inside it is in reality marvelously complex.

Its behavior is no less wonderful than its anatomy. It breathes by means of "respiratory trees," which are long, branched tubes attached to the cloaca. In breathing, water is rhythmically passed in and out through the *posterior* opening of the alimentary tract. Perhaps the most remarkable of all the sea cucumber's peculiarities is the way it defends itself by means of its own viscera. When sufficiently irritated, the animal contracts the muscles of its body and actually ruptures the walls of its own cloaca through which then shoot out the respiratory trees and sometimes the entire gut. In some species there is a special set of tube-like organs, called the Cuvierian organs, attached to the base of the respiratory trees. These, too, are thrown out of the body, and when they come into contact with sea water they swell up and form thousands of sticky white threads, enough completely to ensnare a large lobster, for instance. Such sea cucumbers are aptly called cotton-spinners. After practicing this extensive self-mutilation, the sea cucumber is able to regenerate its lost organs completely.

The Cuvierian organs of the Bimini sea cucumber do not expand in sea water, but Dr. Nigrelli discovered that they nevertheless function defensively. In fact, it was the strange defensive behavior of this animal that he set out to study last June. For some time it had been noticed by Dr. Nigrelli and other workers at the Lerner Marine Laboratory that putting sea cucumbers into tanks with fishes frequently resulted in the death of the fishes. Whenever the sea cucumbers eviscerated themselves, all the fishes invariably died, but occasionally they died in the presence of intact cucumbers. Whatever the sea cucumbers gave off must have been extremely deadly, because fishes many tanks away (but receiving circulating water from the cucumber tank) were killed as readily as those in immediate contact. To find out the source and nature of this powerful substance was the number one problem on Dr. Nigrelli's program of research.

One of the reasons why Dr. Nigrelli was so interested in sea cucumber "poison" was that it seemed to offer an excellent opportunity to demonstrate a theory of his concerning the interrelationships of life in the sea. In brief his idea is this: In the struggle for existence among all the multitudinous forms of marine life, some of these creatures must have developed *chemical* means of overcoming their enemies. Accordingly, the ocean and ocean life should be the source of numerous, biologically powerful substances — especially in shallow, tropical waters where the number of marine species is greater by far than anywhere else. This theory is simply an application of a concept originated by two Nobel Prize winners, Dr. Selman Waksman and Sir Alexander Fleming. Dr. Nigrelli believes the chemical "warfare" that Waksman and Fleming demonstrated as constantly going on between micro-organisms, especially those of the soil, also goes on in the sea, and among both large and small marine creatures.

At the Lerner Laboratory, the first thing that

Another West Indian sea cucumber, showing at anterior end the tentacles employed in capturing f The body is covered by the short, mobile tube-

Dr. Nigrelli found out was that a fluid given off by the Bimini sea cucumber at the time it shot out its "insides" contained very toxic material. He then tested different parts of the animal to discover what organ or tissue was producing this poison. The skin and various internal organs proved only slightly toxic, except for a group of small, pink, finger-like structures, the Cuvierian organs, which turned out to be the most poisonous of all. There was no doubt that this was the principal, if not the only source of the deadly stuff. Even Dr. Nigrelli was amazed at the material's strength. One ounce of a crude extract of Cuvierian organs diluted in more than 750 gallons of sea water killed fish in twenty-three minutes.

When Dr. Nigrelli returned from Bimini, he brought with him a bottle of dried Cuvierian organs for further biological and chemical analysis.

A name for the strange new substance was needed, so he called it *Holothurin,* after the Class Holothuroidea to which the sea cucumbers belong.* Holothurin has proved to be one of the most powerful and wide-reaching of all animal poisons. All kinds of animals are apparently susceptible to it – from protozoans (microscopic one-celled animals) to mammals – and in extremely small doses. It also affects certain plants.

No one yet knows how useful Holothurin will turn out to be, but it is worth noting that some of our most valuable drugs, such as strychnine and belladonna, are naturally-occurring poisons. Because of the peculiar way in which it works, the effect of Holothurin on certain kinds of cancer is being studied. In addition to Dr. Nigrelli and Dr. Paul A. Zahl of the Haskins Laboratories of New York, a whole group of scientists from the Sloan-Kettering Institute for Cancer Research is now investigating the properties of Holothurin.

Even if Holothurin should prove unsuitable for medical use, Dr. Nigrelli feels that he has come a long way toward demonstrating his theory of chemical antagonists in the sea. Moreover, there are other sea cucumbers known to be poisonous. At least one species is used by natives of the Pacific islands to stun fishes. Another is said to be so toxic that mere contact of its Cuvierian organs with the skin produces painful inflammation. And then there are all the other poisonous animals of the sea—some known, many still to be discovered. Among them may well be found important pharmaceuticals.

Conservationists have looked to the sea as mankind's great larder of the future. Dr. Nigrelli believes it may well turn out to be a medicine chest.

* The first scientific report of Holothurin appeared on pages 89-90 of *Zoologica,* volume 37, part 2, published on September 19, 1952.

Animals ARE PART OF THE CHRISTMAS STORY

BY ELEANOR ERRETT

The cock crowed "Christ Is Born", The raven croaked "When?", The rook cawed "This night", The ox mooed "Where?", The sheep answered "Bethlehem", The ass brayed "Let us go", And the bees hummed a carol as they traveled.

MUCH AS THIS JINGLE may seem like a page from a modern nursery primer, it happens to be an ancient European poem, found, with variations here and there, in the literature of many primitive peoples. As any superstitious German, Swedish or even English peasant who is still in touch with the legends of the land may be willing to tell you in a moment of candor about such awesome matters, there is a widely-held belief that on Christmas Eve animals are magically able to talk. However, it is inadvisable to overhear them, for the animals are likely to retaliate by forecasting your death within your very earshot. An event, you are told, which is almost certain to happen just as the animals say.

Animal legend of this sort and actual customs involving animals abound in the history of Christmas as plentifully as plums in a mediaeval plum pudding. Especially so in northern Europe where Christianity was mixed with the strong native paganism of the old Druid and Thor worshippers. November and December was a time of great killing among these early Teutonic people. Since they were not able to keep their cattle through the winter months, they were forced to slaughter huge droves once the snow began. As with all primitive people, killing was a time for worship, sacrifice, ritual and feasting. As time went by and skills improved, the time of killing grew later and later, finally taking place toward the end of December. The Christian holiday of Christmas represents a merger of these heathen feast-festivals and the religious ceremonies celebrating the birth of Christ. The Church did everything it could to stamp out the pagan influences, but naturally strong relics have persisted right into modern times. On St. Martin's Day (November 11th) rural England still keeps its custom of killing cattle, just as many Germans will still kill and eat a goose on that day. In Denmark, too, a goose is eaten and the nature of the coming winter is forecast from the color of the breast bone. At St. Peter's at Athlone in Ireland, a very obvious sacrificial custom lasted well on into the twentieth century. Every household would kill an animal of some sort and sprinkle the threshold with its blood. Not to do so was to invite disaster.

The ritualistic killing and serving of the boar's head in Old England at Christmas goes back to the ancient Druid practice of making a boar offering to the Goddess Freya at the winter solstice. The boar was then worshipped as symbolic of the fertility of the land and he was hunted down and killed with great fanfare and pageantry. The eating of suckling pig today, especially in England, is a survival of this custom. Even the children's game of "blindman's buff" which somehow manages to hold its own against such strong competition as Hoppalong Cassidy, retains some traces of past paganism. Originally a Christmas sport known nearly all over Europe by names derived from animals, like "blind cow" or "blind mouse," the players wore animal masks and the player who was "it" was both the sacrificer and the name of his animal-victim, in keeping with the very best primitive practices in this field.

One of the strangest of all Christmas customs is known as "Hunting the Wren" and while once

a common practice in England and France, it has since been found only in backward portions of Ireland and the Isle of Man. Early Christmas morning, a group of people will track down a wren, kill it, fasten bright ribbons to its body and attach it to the top of a long pole. It is then carried from house to house while the hunters chant these words:

"We hunted the wren for Robin the Bobbin
We hunted the wren for Jack of the Can
We hunted the wren for Robin the Bobbin
We hunted the wren for every one."

At each house the revelers try to collect money and when through, they bury the wren with great solemnity to the tune of Manx dirges. They may occasionally sell feathers of the bird as a talisman against shipwreck.

The Irish have an elaborate rationalization explaining this ritual. They say that long ago during a battle with the Danes, while the enemy was asleep and the Irish were silently creeping up for a sudden attack, a wren alighted on a drum to peck at some crumbs which a sleeping Danish drummer boy had dropped there earlier while eating. The pecking noise awakened the drummer who sounded the alarm and the Irish were defeated. This story, while glib, would hardly explain, among other things, what this custom originally was doing in France and England, where the wren is still popularly called "the king of birds" and where it is considered highly unlucky to kill one at ordinary times. The most likely theory is that the wren was probably once regarded as sacred and the Christmas "hunting" is a survival of the custom of annually slaying a divine animal, such as is still found among primitive people.

This slaying, and very often the eating of a much feared and worshipped animal, was not considered so much as an offering to a god as a means of sharing in the dead creature's special powers and strengths. It was a form of life-insurance — a protection against the unknown, and carrying the body from house to house made sure that everyone was taken care of. A practice in a Cornish village of eating blackbird pie during the holidays could probably be explained in the same way. This also holds true for animal masks or artificial animal forms which have a real head or skin added, and are found everywhere in Christmas customs. The "Old Hob" of Cheshire, England, for instance, consists of a real horse's head enveloped in a sheet. Like the wren in Ireland, and for much the same "real" reasons, it is taken from door to door by boys chanting carols. It is interesting to find that this same horse-form occurs throughout Europe under different names — Schimmel, Klapperboch, Julebuk — and undoubtedly is an offshoot of the early Teutonic sacrificial use of the horse. The Church frowned on these animal maskings and warned that they were evil spirits come to life. As a result people soon grew guilty about such forms and regarded them as bad luck. If one was stupid enough to wander around late on Christmas Eve, it was believed that such creatures were sure to be met with. The terror of Greek peasants during this period are half-animal, half-human monsters called kallikantzaroi. In parts of Germany it is believed that if a man wanders around late on Christmas Eve, he will turn into a werewolf.

All kinds of other eerie animal legends are associated with Christmas Eve. In the north of England it is still believed that bees assemble at this time to hum Christmas carols, and sprigs of holly are therefore placed on their hives to wish them well. In folklore generally bees seem to be regarded as close to humans in their feelings. Then in addition to the widespread notion of talking animals, there is another popular European belief, more Christian in origin, which says that at midnight all cattle slowly kneel in honor of the Christ Child. This belief is held in rural England, in many parts of Europe and even reached the North American Indian. Howison in his "Sketches Of Upper Canada" relates how an Indian told him "On Christmas night, all deer kneel and look up to the Great Spirit." A similar legend widely believed in Syria concerns the bowing of tree branches (and according to some versions, the bowing of animals too) on Epiphany Eve. Another Lebanon legend tells of the origin of the Magic Mule, which in Syria corresponds to our Santa Claus:

It seems that on blessed Epiphany Eve, a certain man was traveling through the country with his mule. Stopping about midnight, he fastened his animal under a tree and went away on an important errand. When he returned later, he looked about for his beast, until finally, glancing upward, he saw it lifted high above his head in the topmost branches of the tree. This proved that just at the hour of midnight the tree had bent down in honor of the Christ Child and in its rebound, had caught

up the animal. Since then, the mule has been considered a blessed creature.

Just where our modern American version of St. Nick acquired his reindeer and sleigh is not known for sure, but it is certain that before he was brought to this country by Dutch settlers he rode a white horse, and children left their wooden shoes outside filled with hay for old dobbin in exchange for the presents they hoped would be left. The whole idea of Santa Claus, as well as the type of animal lore and custom previously mentioned, tends to be absent in those Catholic countries where the religious meanings managed to win out over the native influences. In South America, for instance, or in the south of Europe, the main feature of Christmas is the "crèche" or acting out of the Nativity Scene in which replicas of the donkey and oxen are often used. Here and there, however, one finds local color breaking through in some native touch. Dr. Beebe reports that in Salvador a Christmas manger was filled with vigorous spoonbills, zopilotes and armadillos in place of burros and cows.

There is a happy tradition in Europe that all farm animals should be given special food treats at Christmas time. In Czechoslovakia it is believed that if wheat is kept in the pocket during the church service and then given to the chickens, it will make them grow fat and fertile. In Norway as part of the Christmas holidays, no bird, mammal or fish is trapped, shot or netted for two weeks. And one of the nicest customs of all is the practice in Scandinavian countries of giving wild birds a Christmas tree. A former minister to Sweden, W. W. Thomas, described his first glimpse of these trees like this:

"One winter day, at Christmas time, I had been skating on a pretty lake, Daljen, three miles from Gothenburg. On my way home I noticed that at every farmer's house was erected, in the middle of the dooryard, a pole, to the top of which was bound a large sheaf of grain. 'What is that?' I asked my companion. 'Oh, those are Christmas trees for the wild birds' he answered. 'There is not a peasant in all Sweden who will sit down with his children for Christmas until he has first raised aloft a Christmas dinner for the little birds that live in the snow.'" Even the dour Scots got around to these animal amenities, although in Presbyterian Scotland this happened about a week later than anywhere else. Robert Burns struck a fitting yuletide note as he concluded his "Farmer's Address To His Auld Mare" with these lines:

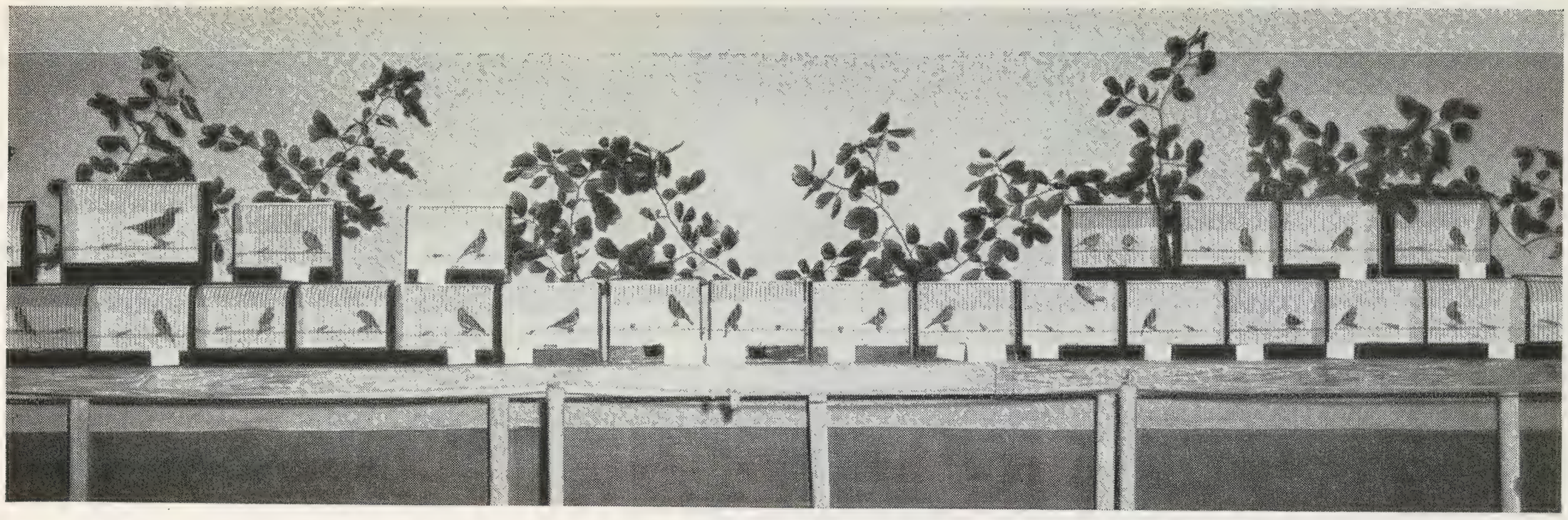
"A guid New Year I wish thee, Maggie!
Hae, there's a ripp to thy auld baggie."

"*The Fancy*" Still Holds Its Own

BY LEE S. CRANDALL
General Curator Emeritus, New York Zoological Park

On October eleventh and twelfth, 1952, the Bird Fanciers' Association of New York staged its eleventh annual exhibition in the Heads and Horns Museum in the Zoological Park. About 200 birds, including canaries, finches, weavers, tanagers and talking mynahs, all in perfect health and condition, each in the neat standard show-cage suitable for its species, were ranged around the walls of the large, square room. Within the central space the exhibitors hovered protectively near special pets, or waited eagerly for the doors to open and admit the expected visitors. For this was not a competitive exhibition, but one staged purely because of the wish of people whose interests bring them great pleasure, to share their joys with others. In the years in which these exhibitions have been produced, at least a quarter of a million of our visitors have been exposed to the impact of this eagerness to give. Certainly not all have been pervious to its force, but who can doubt that it has been felt by many?

What are the reactions of the casual visitor who thus encounters, completely unprepared, the unfamiliar world of the "Bird Fancy"? Greeted by the overwhelming volume of a mixed chorus of bird song, even the most indifferent must respond, however slightly, to the beauty of form



In these small, neat show-cages the Bird Fanciers' Association exhibits its treasures in the annual shows at our Heads & Horns Museum.

and color of the individual songsters, as he moves slowly past the benches. He must wonder, too, and with some cause, what manner of people are these who, with obvious pride, announce themselves as "fanciers." For this is an ancient term, once widely used, now almost restricted to initiates. The Century Dictionary says of "fancy": "To breed or raise, with reference to pleasing the fancy; produce as a fancier, (rare)." But "fancy" was not always rare, for in early English days it applied to the cult of the boxing ring, to the intense, competitive interest in diseased, particolored tulips, and to the devotion accorded domestic pigeons, especially to those known as "high class": the Pouter, the Carrier, and the Short-faced Tumbler.

The regard in which the latter "fancy" was held is well expressed in a quotation by W. B. Tegetmeier,* from the great Thomas Huxley:

". . . and I wish you to understand that in approaching the subject, I would speak with all humility and hesitation, as I regret to say that I am not a pigeon fancier. I know it is a great art and mystery, and a thing upon which a man must not speak lightly; but I shall endeavour, as far as my understanding goes, to give you a summary of the published and unpublished information which I have gained from Mr. Darwin."

Much of the "mystery" of those days is now common practice, having been replaced by general, if often empirical, understanding of genetics. But the "art," with its many implications, still remains as the intangible core of any "fancy."

If "art" is extended to include appreciation, then our present day bird keepers can help only by expressing their own enthusiasm, for objects of beauty arouse varying responses in individuals, whose reactions can usually not be fully reproduced in words. But the art of keeping a cherished bird in perfect health and happiness can be told in minute detail, a practice not commonly prevalent in the days of Huxley and Tegetmeier.

Bird fanciers, in general, are persons who derive great aesthetic pleasure from close association with their pets. In many cases, the greatest satisfactions are had in solving the difficulties of meeting the requirements of a creature as rare, delicate and surpassingly beautiful as the Festive Tanager that was to be seen in our Heads and Horns Museum last October. Others find outlet for their creative impulses in breeding canaries in an effort to meet or exceed the standard of beauty of form or song, established for the numerous recognized varieties. In this century, the wish for canary colors beyond the conventional yellow, green and cinnamon has been met with the production of white, blue-gray and fawn.

Until very recently the much-desired red canary could only be simulated by color feeding, during the molt, with preparations of sweet peppers but unfortunately the deep orange tone acquired was lost at the first molt. Recently it has been found that male hybrids between the Red Siskin of northern South America and the canary are partially fertile. By pairing these hybrids with canaries, perfectly fertile offspring, of varying shades of orange, are produced. This discovery has resulted in the development of a new branch of the "fancy," bringing untold pleasure to its many devotees.

* "Pigeons," London, 1868, p. 35

MONARCH OF THE ARCTIC WASTES

BY GEORGE G. GOODWIN

During the short Arctic summer, fields of drift ice break loose from the eternal snow piled around the polar ice cap and start on their journey southward past the margin of the most northern limits of dry land. Only the lapping of the waves on the Arctic coast and the grinding of the pressure ice as it cracks and crumbles break the stillness of this distant field. Here herds of white-tusked walrus, their skins often gnarled and cracked like the bark of an aging tree, haul out on the floating ice to rest and sleep. At regular intervals seals climb out on its slippery surface after their fishing excursions. Then, here too is the favorite hunting ground of the great white bear, the circumpolar seas of the Arctic its home by choice. The polar bear is not known in Antarctica, and has no relatives there.

Associate Curator, Department of Mammals, American Museum of Natural History

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With the changing seasons the white bear moves northward in summer and drifts southward again in winter, following the edge of the creeping ice fields. It can not survive long on the unbroken ice, nor indefinitely on dry land or in the open sea, but the polar bear lives happily where there is a reasonable combination of all three. Geography has a definite influence on the concealing coloration of Arctic animals and the white coat of the polar bear enables it to successfully stalk its prey in this land of snow and ice. Since the bear fears no natural enemies except the Eskimo, the whiteness of its coat is not a protective measure like that of the great white hare, except as a means to conserve body heat.

Though a tremendous fellow, almost if not quite as large as the giant Kodiak bear, the polar bear is usually shy and retiring, often choosing rather to run than attack at the approach of man. However, the behavior of wild animals is unpredictable and on occasion it may turn and fight without provocation, depending on its mood and temper. Driven by hunger, the polar bear has been known to stalk and actually kill fishermen just as it does the seals. During cold stormy days it is more likely to be aggressive than when the weather is warm and sunny.

Not only in its yellowish white coat does the polar bear differ from other bears; it has a comparatively small, slender head and a long neck. The soles of its feet have a protective covering of hair that enables the animal to move freely on slippery ice. The nose, lips, eyes and pads on the feet show as black dots against the uniform white of its coat. An average polar bear in its prime will weigh about 900 pounds, but large individuals have turned the scales at 1,600 pounds. A grown animal will stand 4 feet or more at the shoulder and measure 9 feet in length; females are about 25 per cent smaller than the males and rarely exceed 700 pounds.

We have heard of Barren Ground grizzlies suffering from snow blindness, but never the polar bear; its eyes have a nictitating membrane something like that which protects the eyes of birds.

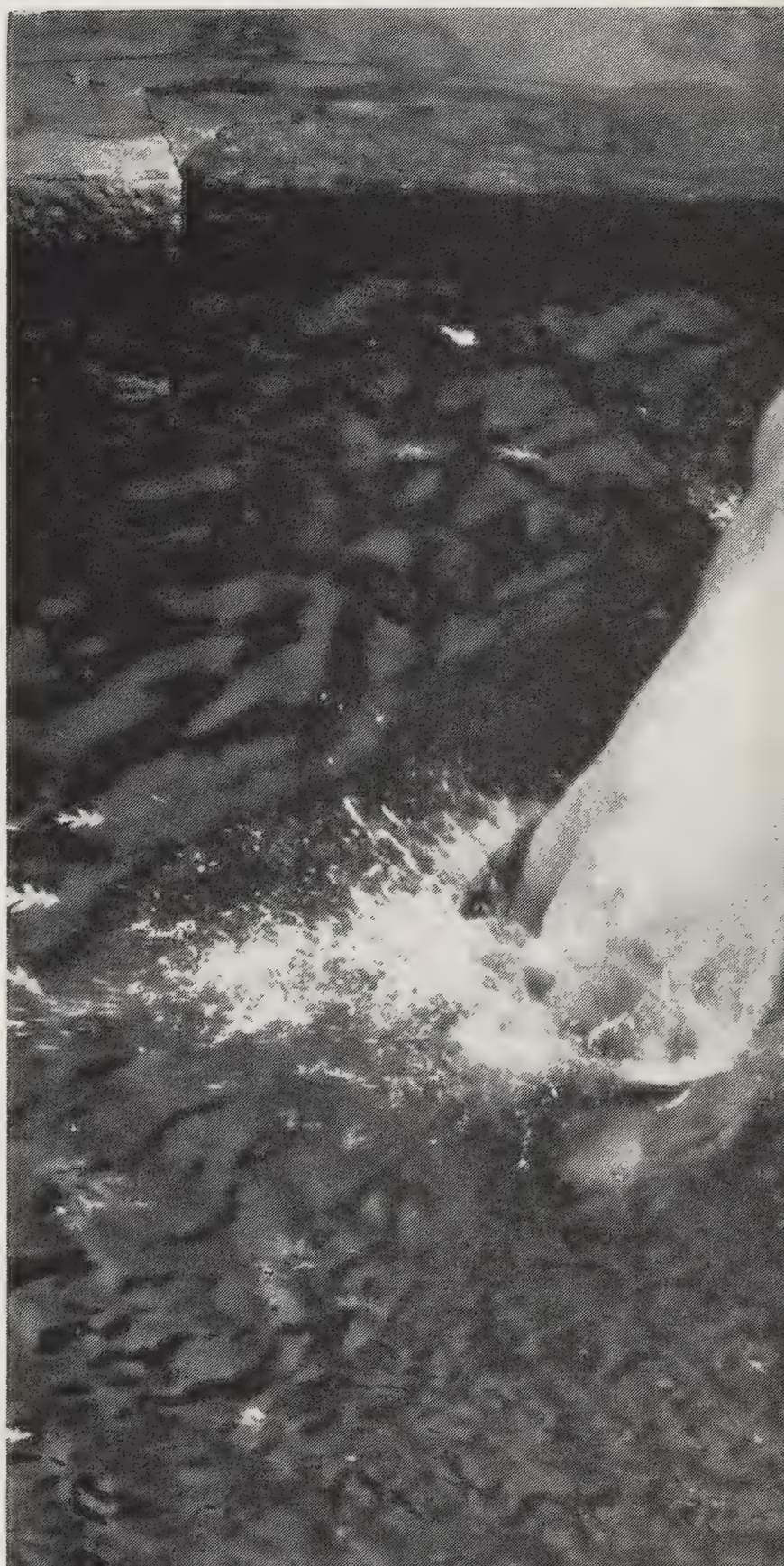
While this sometimes-called "water bear" is at home on the offshore ice, it will often swim boldly to some iceberg out of sight of land, and has been seen on ice floes 200 miles from shore. It is a strong swimmer and will dive, turn and twist in the water with a graceful roll. It may propel itself along with all four limbs in dog fashion, but often swims with its forefeet, carrying the hind limbs straight out behind like a seal. Between four or five miles an hour is the average speed of a polar bear in the water, and six miles in a short spurt. On land and ice it can gallop along much faster than a man can run, and has a charging speed of 25 miles an hour.

The polar bear is a tireless traveler. It wanders over a vast extent of ice and land in its never-ending search for food. It can see a moving object more than a mile away, and by its sense of smell can detect food at an even greater distance than it can see. Sounds do not seem to have much

Ice Kings In the Zoo

Photographs by SAM DUNTON

POLAR BEARS seem to enjoy life more than almost any other animal. Winter or summer — but more constantly during the hot season — they are in their swimming pool for many hours a day. If one plunges in, it is almost certain to be followed by one or two more with the object of mock fighting in the water. Any plaything, an aluminum keg or a mere stick, is a toy that will give them endless amusement. The four Polar Bears in this group are young animals, all of about the same age. They came to us from Denmark, the male in 1948 at the estimated age of two years and the three females in the fall of 1946. Presumably they were born somewhere in the Arctic Circle during the winter of 1945-46. So far all four animals live together amicably, with only minor squabbles.



effect on the polar bear; probably its sense of hearing is deadened by the pounding of the surf and the grinding sounds of the pack ice.

Of all the bears, the white bear is the most carnivorous; its staple food is seal, which must be caught by stealth since the polar bear is no match for these "fin-footed" sea rovers in the water. A dead whale washed ashore will provide several polar bears and many Arctic foxes with food for weeks and even months. Twenty polar bears and five times as many foxes were counted feeding on a dead whale washed ashore on the Arctic coast of Alaska. In the spring polar bears visit the islands in the Arctic Ocean and devour the eggs and young of birds that nest there. They dig the puffins out of the ground and follow inland streams to feed on the spawning fish, and vary their diet with roots and grasses.

THE MYSTERY of the romantic page in the life history of the polar bear begins on that day in mid-March when the sun once more rises and shines on the chilly polar seas. The snow shrinks rapidly before the warm southern breezes and glorious flowers hedged around with ice shoot up on shore in an incredibly short time. During the first days of this brief Arctic summer the male bear becomes restless and soon sets out in search of a mate. Of what transpired during the courtship we know nothing, but by the end of June or July the matrimonial bond is broken and each goes its own separate way. The male bear goes back to his hunting on the cold bleak ice floes.

Most bears spend the long winter months in blissful sleep, but not the rugged polar bear. The day that dawned in mid-March lasted until the middle of September, and now during the long Arctic night, broken only by the flickering flashes of the northern lights, the male bear wanders across the wastes of ice and snow hunting seals that haul out through their breathing holes.

With the female now an expectant mother, it is a different story. She feasted during the summer harvest on the bountiful supply of food and is now encased in a protective layer of fat that must not only sustain her during the long winter night but her two cubs as well.

Long before she could possibly realize her condition, the pregnant female prepares for her coming family. With an unerring instinct she turns her back on the sea and makes for her ancestral homeland. Here in some sheltered nook on high, dry ground the expectant mother scoops out a den in a deep snow drift; down and down she digs until the solid earth is reached. The sun once more disappears below the horizon and in the outside world the snow drifts deeper and deeper above her. For ventilation a small chimney is kept open by the rising warm air from her body. In her cased-in quarters the female now curls up contentedly and dozes off to sleep. Dull and drowsy, she lives on, without food, nor does she leave the den until spring. Toward the end of January or the beginning of February, the cubs, usually twins, are born almost naked and with eyes closed; they are tiny and puppy-like, about 10 inches long and less than 24 ounces in weight. Snuggling in the deep fur close to the mother's body for warmth, they sleep and nurse until spring. The cubs grow rapidly and are soon covered with snow-white downy fur, and open their eyes when 6 weeks old. Not until the warmth of the March sun has weakened the walls of her ice-crusted nursery does the mother break out into the fresh air of the outside world. Leaving the den behind, she leads her twins toward the Arctic coast — the real source of sustaining food. The long trek back to the sea may cover some ten, twenty or more miles. Often the little ones grow weary, and then the devoted and understanding mother draws alongside some convenient rock where the tired youngsters can scramble onto her back and ride. The wholehearted love of the mother for her young will suffer no harm to come to them, and woe to any foolhardy man or beast that dares to come between them.

For the short summer the cubs are dependent on the fond mother for a livelihood. At first she teaches them to supplement their milk diet with crabs and other small crustaceans found in shallow water. As time goes on they learn to stalk larger game by watching the mother. When fall comes around the cubs can feed themselves. This winter the mother bear does not retire to her den to sleep but wends her way over the ice fields, like her mate. The cubs may remain in her company until spring, when the two-year mating cycle comes around again.

To the people of the far north the polar bear was and still is an important source of food. A

900-pound animal would feed a whole family of Eskimos for many days. The meat is wholesome and sweet but the liver is considered uneatable. Those who have tried it claim they have suffered extreme nausea, dizziness and peeling of the skin. In former days it was no small feat for a native hunter to kill a polar bear with his homemade harpoon and short spear. The Eskimos make articles of clothing and sleeping robes from its hide. The teeth and claws are fashioned into ornaments and strung into necklaces. It is the ambition of every Eskimo hunter to wear such trophies as proof that he has killed the great Ice King.

A Mexican Platy Became

THE TURKISH BLACK FURY

BY MYRON GORDON
Geneticist of the New York Zoological Society

A pair of the new Turkish Black Furies — the male is the small and slender fish.

I CHANCED UPON a new, dark and attractive color variety of the Mexican platyfish in a most unusual place. I found it in the Marine Biological Laboratory of the University of Istanbul, along the Bosphorus in Turkey.

On many platyfish collecting expeditions to Mexico and Central America I always had to work hard to get the inch-long, elusive fishes. First I had to locate them, for they are not found in all waters. Then with a fine-meshed minnow seine I had to sift them out of their weed-entangled water homes. Fishing for platyfishes in their native jungle-bordered rivers and ponds is not sport fishing. It's a job, most often a dirty one.

Getting the blue-black platyfish in Turkey was as easy and pleasant as taking a tall cool drink from a proffered tray. A glass jar hardly larger than a water tumbler containing a beautiful pair of a rare sooty-black platyfish was presented to me by my friend, Doctor Curt Kosswig.

My mission in the summer of 1950 was not planned as a platy-collecting trip. Earlier that year Doctor A. Lacassange, president of the Fifth International Congress of Cancer, invited me to describe the results of our research on the influence of heredity in the development of a particularly malignant kind of cancer known as mela-

noma. This dangerous black form of cancer knows no favorites. It attacks man and other animals: dogs, horses, snakes, salamanders and fishes. Even the lowly oyster is not immune. Of all the animals used in study of the influence of heredity in melanomas, none are better than the black-marked platyfish. That is why the dark-colored platies are studied in cancer research laboratories in various parts of the world.

Before the Cancer Congress in Paris, Doctor Alexander Haddow, director of the Royal Cancer Hospital in London, arranged for me to lecture before the Royal Society of Medicine. The date, by chance, was July 4. The day after the lecture I flew to Istanbul where Doctor Curt Kosswig asked me to speak at the University. He and I had studied inheritances in platyfishes for nearly a quarter of a century but we had never met before. Over the years he, as well as I, had developed several new platyfish. One of Doctor Kosswig's inventions was a beautiful dark variety which he appropriately called *fuliginosus* because of its sooty black coloring. I think we will call it the Turkish Black Fury. (*Fu* of the "Fury" is genetic shorthand for *fuliginosus; r* represents the color Red in the "Fury" platy; *y* just rounds it out.)

I had moments of anxiety in conveying the Turkish Furies in a pint of water from the Bosphorus to New York. From Turkey we flew first to Athens, then to Rome, circling the moon-like crater of Mount Vesuvius, then over the Mediterranean to Paris. I almost lost the Furies in a Parisian hotel where the maid, with the kindest of intentions, was on the verge of exchanging the well-conditioned water for fresh tap water. That would have been fatal. During the ten days in Paris I fed the Turkish Furies emergency rations of tiny crumbs of the hard crust of French bread that was brought to my room every morning as part of the *petit déjeuner,* and bits of fish and meat. From France we flew, in the late afternoon, over the channel to London; we dined in Ireland, breakfasted in Canada and then got in to New York for lunch.

The first public American showing of the Turkish Fury is currently being made in our Aquarium. Soon we will release them to scientists and aquarists everywhere, for our Furies have multiplied and there are enough for all.

Our Biological *"Point Four"* --a Year Later

BY WILLIAM BRIDGES

Curator of Publications, New York Zoological Park

IT WAS JUST A YEAR AGO that Miss Jocelyn Crane of our Department of Tropical Research staff came home from Europe with enthusiastic accounts of the work being done in biological laboratories she had visited, and several less happy stories of work being halted by the merest accident of circumstances: a thermocouple unobtainable in this laboratory, a chemical not available in another, a colony of experimental fishes lacking elsewhere.

It is well known that there are several things in the world that money won't buy, but thermocouples, chemicals, fish, microscopes, wire netting, turtles and scientific journals are not among them. These easily obtainable objects (easily obtainable *with money*) were among the shortages hampering specific research jobs that we knew about and it will be recalled that President Osborn at the annual Members' Meeting of the Zoological Society last January announced that our own "Point Four" program of aid to European biologists had been set up to do what we could on a "laboratory table" basis. Five thousand dollars had been set aside by the Society's Board of Trustees for the purpose.

The year for which the money was appropriated is nearly over and only a few hundred dollars remain, with a few applications still to be acted upon. It is a good time to take a look and see where the money went.

It went to 22 laboratories in 12 countries stretching all the way across free Europe:

England	Belgium	Austria
France	Denmark	Switzerland
Spain	Sweden	Italy
Holland	Germany	Turkey

Biologists, like most people, want many things and it is probable that any one of the recipients of our "Point Four" aid could have spent the entire $5,000 in his own laboratory and still found a few odds-and-ends he could use if he had the money. Nevertheless the requests for specific aid were curiously modest, limited and practical. It was made clear when we asked for the submission of requests that the money would have to be spread fairly thin, and no laboratory — however great its need — sought more than the most essential research equipment.

Grants have ranged from $50 (for the purchase of certain North American fishes needed for cytological studies in a Swedish laboratory) to $400. One request we were able to fill without expense to the "Point Four" fund — a nearly complete back file of our own journal, *Zoologica*. Another we filled in large part by supplying a duplicate file of *Biological Abstracts* that had been gathering dust in one of our storerooms for some years.

Here is a brief summary of the requests we have filled, or that are in process of being filled.

England

Dissecting microscope for studies in isolation, cultivation and physiology of unicellular algae and protozoa.

Colonies of several species of sticklebacks for studies of reproductive behavior.

Crocodiles and other reptiles needed for neurological research.

France

Back file of *Zoologica* of particular value to a laboratory of marine biology.

Spain

Books and periodicals in genetics, furthering research in the heredity of "split hand" in a Spanish family and other matters of heredity.

Holland

Microscope for studies on the physiology of diapause and endocrinology of insects.

Belgium

Special lights and batteries for research work on the nocturnal movements of migrating birds.

Denmark

Motion picture camera to photograph the development of moths, the biology of solitary wasps and the behavior of male moths in relation to the olfactory sense.

Sweden

Ultraviolet spectrophotometer for work on species-specificity of "fertilizin," a substance elaborated by eggs, which initiates fertilization. This substance has been isolated from eggs of aquatic invertebrates and vertebrates.

North American fishes, especially *Lepidosteus, Amia* and *Acipenser,* for work on the cytology of their chromosomes.

Germany

Certain species of American turtles and books on embryology for studies on comparative ethology.

Back files of technical journals in zoology.

Wire netting for confining experimental animals (geese).

Lizards for population-genetics studies and work on the physiology of color modifications in *Lacerta agilis.*

Austria

Chemicals and other equipment for a station working on water ecology.

Motion picture camera needed for recording behavioral development in young animals.

Special thermometers for limnological work.

Switzerland

Weasels for studies of their sexual biology.

Italy

Histophotometer for measuring the amount of nucleic acids in gametogenesis of insects, amphibia, annelids and molluscs.

Special thermometers for studying temperature relations in desert-dwelling animals.

Turkey

Airplane transportation for a collection of tropical fish being studied in a genetics laboratory.

Most of the research material requested and granted has been received by now, and is in use in European laboratories. As President Osborn said in his announcement last January, all of it is material that we "take for granted in our own laboratories." The letters of acknowledgment we have received from the recipients indicate that it is not taken quite that casually by them.

The National Park Service Takes Over Jackson Hole Wildlife Park

By FAIRFIELD OSBORN
President of the New York Zoological Society

A FEW YEARS AGO the Society undertook to carry out quite an original idea. It stemmed from the belief that a distinct contribution to the protection of some of the outstanding forms of animal life in the Rocky Mountain region could be made through the creation of a preserve where the public could see and familiarize itself more intimately with some of the great animals of the West such as buffalo, elk, moose and antelope.

Consequently, in cooperation with the Jackson Hole Preserve, Inc., through its President, Laurance S. Rockefeller, and with his unflagging encouragement and generosity, as well as with the Wyoming Game and Fish Commission, the idea became reality when the Jackson Hole Wildlife Park was established in 1948. This project proved an almost instanteous success, and each year has increased in popularity as it became known throughout the country that, by visiting the Wildlife Park, one could really be sure of a good view of fine herds of buffalo and elk and have a good chance of seeing moose and antelope. This last season visitors from every state in the Union and from six foreign countries signed the guest book at the Information Center. In this little building literature was distributed which informed visitors concerning wildlife and its values and the need for its protection.

In the meanwhile, through act of Congress, the land on which the Wildlife Park was situated became part of the Grand Teton National Park. After this occurred negotiations were entered into with the National Park Service and were brought to a happy conclusion recently under a plan by which the operation of the Wildlife Park from now on will be taken over by the National Park Service. Naturally, the Zoological Society will cooperate in every manner that it can, and will supply literature and other suitable material regarding wildlife and the need for its protection.

It will be recalled that simultaneously with the creation of the Wildlife Park our Society established a research station in the same region. The work of this station has been devoted to a series of intensive and technical studies of the animal life of this region, as well as the plant life, climate and other physical characteristics in the environment. On the basis of a large amount of such factual data, growing emphasis has been placed during the past two years on the studies of the life habits of animals, patterns of migration and social groups of wild animal populations. A large amount of valuable work still remains to be done and consequently it is our plan to continue the work of the station indefinitely. It happens to be the only one of its kind in the entire Rocky Mountain region.

Our Society seems justified in feeling that it has accomplished a distinctly worthwhile thing in the creation of the Wildlife Park. Now, under the arrangements with the National Park Service, it is expected that this project will continue to serve a highly useful purpose in the years ahead.

THE CASE OF THE KIDNAPPED COLOBUS

By ROBERT M. McCLUNG

Acting Curator of Mammals & Birds, New York Zoological Park

EVER SINCE THEIR ARRIVAL from the Belgian Congo three years ago last June, we have taken special pride in our groups of Uele and Angola Colobus monkeys. There are several good reasons for this satisfaction.

First and foremost is the continued health and good condition of the animals themselves. Colobus monkeys have a reputation for being delicate and difficult to keep in captivity, and are consequently very seldom seen outside their native haunts.

Secondly, their striking appearance makes Colobus monkeys prime exhibits. Our male and two female Uele Colobus (*Colobus abyssinicus uellensis* Matschie) are among the most beautiful monkeys in our collections, with their lustrous black fur set off by gleaming mantles of long white hair on their flanks and lower backs, and long white-plumed tails.

It was a big event, therefore, when we found one of the two Uele Colobus females clutching a new-born baby on the morning of September 25. It was the first of this species born here, or in any zoo as far as we know.

The youngster's short, wavy fur was all white in contrast to its mother's black and white pelage. The skin over most of its body was light-colored, but its hands and feet were almost black. As we later determined, it weighed 1.18 pounds. Hopes were high that we would be successful in raising it.

Within a very short time after discovery, however, it became evident that all was not progressing smoothly within the family group. The mother was not holding the youngster naturally. This was presumably her first baby, and she seemed to be at a loss as to just what to do with it. To complicate matters, the maternal instinct of the other female seemed to be aroused, and she made several attempts to take the baby from

The birth of this baby Uele Colobus monkey in our collection on September 25 was the first such event in any Zoological Park, we think. After early difficulties, the baby is doing well.

its mother. The father gave evidence of a protective interest in the baby, and several times warned the other female to keep her distance by leaping at her when she approached too close to the mother.

After several hours, however, in spite of the efforts of the parents, the single female was successful in snatching the baby from its rightful mother, and bounded about the cage carrying it precariously in her arms.

It was obvious that something had to be done immediately if the baby was to be saved. After a hectic ten minutes, the parents were boxed and removed to another cage in the Primate House. Finally the kidnapping female was captured and forced to give up the baby. Wrapped in a soft cloth, the new-born monkey was carried to the hospital. There it was examined and weighed, and the dangling umbilical cord was removed. The baby was then replaced in the cage with its parents.

The mother monkey immediately picked up the baby and clutched it tightly to her. She held it facing away from her, however, and not in the normal position facing her breasts. She seemed to be quite nervous and fearful when watched, and was disturbed as little as possible for the rest of the day. The baby was not seen to nurse. It was decided to leave it with the mother through the night, and if there was no evidence of its nursing by the next morning we would take it from the parents and attempt to rear it on the bottle.

Next morning, all seemed well. Now the mother was holding the baby in the correct monkey position and it was seen to nurse. The little fellow was lively and active and squirmed about in its mother's arms. From time to time it uttered shrill little squeaks. From that day on there has been no trouble and the female has become an ideal mother.

A month after its birth, the baby's fur has changed from white to a distinct creamy-buff color. It will be interesting to note how long it takes the young Colobus to assume the striking black and white pelage of its parents.

The Angola Colobus is less striking in appearance than the Uele form. This affectionate knot consists of a female (at left) and three males.

Our other group of Colobus consists of one female and three young male Angola Colobus (*Colobus polykomos angolensis* Sclater). This form is mostly black, with small white shoulder tufts and outflaring white whiskers on either side of the face. The lone female gave birth to a baby in February of 1952. This youngster lived only eleven days. In appearance it was very much like the Uele Colobus baby, except that its fur was creamy-buff from the first. The young of practically all of the different forms of Colobus monkeys are similarly light-colored at birth.

All of our adult Colobus monkeys have thrived in captivity, living in outdoor cages during the warm summer months and being transferred to heated indoor cages during the winter.

Besides the regular zoo diet for monkeys, consisting mainly of fresh fruits and vegetables, our Colobus are very fond of leaves. They consume great quantities of fresh mulberry leaves in the summer, and bamboo and lettuce during the winter. This leafy portion of their diet may well be the answer to keeping Colobus monkeys successfully. The San Diego Zoo probably holds the longevity record for Colobus in captivity. It still has a healthy East African specimen which was received in October, 1940. Like our Colobus, San Diego's specimen is very fond of leaves, and eats quantities of Blackwood Acacia.

Speaking generally, the Colobus monkeys are most nearly related to the Asiatic Langurs and, according to some zoologists, form with them a distinct and separate family of monkeys. The Langurs and Colobus monkeys, however, are usually considered a sub-family, the *Colobinae,* of the great family of Old World Monkeys.

The genus *Colobus,* which includes all of the many different forms of Colobus monkeys, ranges across Africa from Abyssinia to Zanzibar in the East, and from Gambia and the Cameroons to Angola in the West. This range is not continuous, for in many portions of that vast area Colobus monkeys are found only in certain isolated spots or "islands" of population. They usually live in heavily forested areas. Some forms are found at sea level while others inhabit the slopes of Kilimanjaro and Ruwenzori at altitudes up to 9,000 feet.

All Colobus monkeys are characterized by a slender build, very long tail, large compartmented stomach adapted for a leafy diet, prominent rump callosities, no cheek pouches and practically non-existent thumbs. This latter peculiarity is responsible for the name *Colobus,* derived from the Greek and meaning "mutilated" or "stunted."

Although systematists are in disagreement as to the specific status of the various forms of Colobus monkeys, they may be divided very broadly into two main groups – the Red or Bay Colobus, and the Black and White Colobus monkeys.

It is generally agreed that the Red Colobus, (*Colobus badius*), consists of but one species, with numerous forms which range across the African continent from Gambia to Kenya and Tanganyika. One form is found on the island of Zanzibar.

The second broad group, the Black and White Colobus monkeys, with which we are most concerned here, can be divided by external characteristics into four main sections, as follows:

1. All-black Colobus Monkeys (the *satanus* section), found in Gaboon and the Cameroons. 2. Black and White Colobus Monkeys with all-white tails (the *polykomos* section). The forms of this group range from French Guinea to the Ivory and Gold Coasts. 3. Black and White Colobus with side whiskers and with the hair arranged in a sworl on their heads (the *angolensis* section). The forms that constitute this group are found in the forested areas south and east of the Congo and in Tanganyika and Kenya. They are represented in our collection by the Angola Colobus. 4. Black and White Colobus with long flank and back capes of white fur (the *abyssinicus* section). This group, the most spectacular of all the Colobus, ranges from Abyssinia south through Kenya, Uganda and the Belgian Congo, and is represented in our collections by the Uele Colobus.

The various races of the last-named section are by far the best-known of all the Colobus monkeys because of the striking beauty of their fur and the length of their white capes and tail plumes. For many years this "monkey fur" was used extensively for trimming ladies' coats. As one author* remarked more than fifty years ago: "The beautiful skins of many of the species form a considerable article of commerce in Europe and America to adorn the costumes of the most re-

* Forbes, H. O.: "A Handbook of the Primates" 1897, Vol. II, P. 87.

fined and cultivated ladies, who vie for their possession with the semi-nude and barbarous warriors of Equatorial Africa, by whom they are also used as ornaments for their persons and for decorations for their weapons."

Though the European and American trade in Colobus fur for use as a fashionable trim has ended, the East African natives, from time immemorial, have used the skins for adornment. The Masai tribe, for example, makes mantles, capes and hats of the fur, and use it to adorn their shields. Another tribe, according to a European eye-witness, found an ingenious use for the heavily-plumed white tails, fastening them, as he related, to "that portion of their bodies where tails should rightly appear if man had not dispensed with such appendages." The Andorobo tribe in Uganda is reported to be very fond of the flesh of Colobus, which has been described as sweet and succulent.

Of the natural history of the Colobus monkeys, not a great deal is actually known. They customarily travel in small bands, or family groups, and are almost exclusively arboreal, being usually seen in the high treetops.

When alarmed, they can travel through the forest top at a considerable rate of speed, navigating from tree to tree by tremendous leaps. Their diet is almost exclusively vegetable, consisting mainly of tender shoots and leaves, of which they consume great quantities, together with some fruits.

News from the Conservation Foundation

Flood Control Methods Survey Nearly Ready to Launch

Investigation of the desirability of undertaking a major study of American flood control methods is rounding into an active project, and a study plan has been prepared and approved by the advisory group appointed for this purpose. The U. S. Corps of Engineers has agreed to make its field personnel available to assemble data for the study. There is every indication that the U. S. Department of Agriculture will do likewise.

If undertaken, this study will represent a significant forward step in the Foundation's work, since the staff will in fact be operating as coordinators for several Federal agencies.

President Osborn Honored

THE 1952 AWARD of the Theodore Roosevelt Distinguished Service Medal was made October 27 to the Society's and the Conservation Foundation's president, Fairfield Osborn, and to John Foster Dulles, Republican foreign policy adviser. This award is sponsored jointly by the Roosevelt Memorial Association and the Women's Theodore Roosevelt Memorial Association. Presentation was made at a dinner at Theodore Roosevelt House, 28 East 20th Street, presided over by Roger W. Straus, vice-president of the Roosevelt Memorial Association.

The citation to Mr. Osborn reads as follows:

"For the Medal for distinguished service in behalf of the conservation of the nation's natural resources, Mr. President, I present the honored son of a revered father who, twenty-nine years ago in a ceremony in the East Room of the White House, received the first of these Medals from the hand of the President of the United States. Born into an environment in which the geologic ages were his yesterdays, Nature his nurse, and her furred, finned and winged children his companions and friends, an eager student of the sciences relating to vegetable and animal life and the inter-relation of all living things, imaginative and effective president of the New York Zoological Society, he noted with dismay the world-wide waste of the physical materials on which human life depends, and foresaw, in its continuance, the grim alternatives of regimentation or extinction.

The statesman in him gave leadership to a movement that resulted in the establishment of the international Conservation Foundation; the ecologist, in him, the poet and the prophet, produced a book that startled a wasteful generation into a new apprehension of the challenge of our plundered planet.

"I present, Mr. President, a fighter for all our tomorrows – Fairfield Osborn."

"Living Water" Film Completed

The two-reel "Living Water" series, fourth of the series of conservation films produced by the Foundation's audio-visual staff, has been completed and will shortly be offered for distribution by Encyclopaedia Britannica Films.

E.B.F. reports that the Foundation's films have been more successfully distributed than any others they have ever handled. A single master contract to cover all film distributed for us by E.B.F. is in negotiation.

George Brewer Returns to Foundation

George E. Brewer, Jr., on two-year leave for defense work in Washington, has finished his assignment there, and returned to the Foundation staff in mid-November.

Soil Erosion Survey in Active Progress

After several conferences at the Washington headquarters of the Food and Agriculture Organization of the United Nations, it has been determined that the Soil Erosion Survey can be completed this autumn. Mr. Van Beers has been assigned to field work in this connection and has gone to Guatemala to pursue the project. Peter Stern of the Foundation research staff has gone with him to keep in touch with the progress of this survey.

Foundation Publications Go to Press

The Report of the Pittsburgh Law School's Study of Resource Legislation and Administration in the State of Pennsylvania has been turned over to the Ronald Press for publication in book form. The contract for this work is in preparation.

The Foundation's Forestry Report has been completed and will be published as a special supplement to *American Forests* in the December issue of that magazine.

The collection of essays on the subject of conservation education assembled by the Foundation at the instance of the Ford Foundation has been issued by mimeograph, and will be submitted to the Ronald Press for consideration as a book.

BEHIND THE SCENES

NEWS AND NOTES OF THE ZOOLOGICAL PARK, THE AQUARIUM AND THE DEPARTMENT OF TROPICAL RESEARCH

Herbert Is Getting Too Big For His Scales

"Herbert," our young Walrus, weighed 725 pounds on October 10, an increase of 40 pounds in one month. We have not been able to weigh him since then because he is bigger than the plywood platform originally built for the weighing scales. A new platform is being built, but the scales will weigh only up to 800 pounds and Herbert will soon exceed that weight, if he doesn't already. Thereafter an attempt will be made to "walk" him a few hundred feet from his pool to the Zoo's large platform scales for weighing trucks.

Exchanges of Snakes Bring Species New to Us

In most large collections of reptiles there is a surplus of commoner species that are far from common – and therefore much desired – in zoological collections in other countries. Recently we have been getting rid of some of our surplus stock, including Prairie and Timber Rattlesnakes, Northeastern Copperheads, baby South American Boas, Bullfrogs, Horned Lizards, baby Iguanas and Anolis lizards. Some of these, no doubt, were new to the collections to which they were sent. Certainly the specimens received from abroad were

most welcome to us and included some we had never exhibited before.

New to our collection were four Gray Monitors, a gift from Tel-Aviv, Israel; a Ladder Snake from Cap Ferrat, France; and three Crossed Pit Vipers from the Instituto Butantan in Sao Paulo, Brazil.

Other recent acquisitions by the Reptile Department were a Palestinian Whipsnake and a Montpellier Snake from Tel-Aviv; Aesculapian Snakes, a European Whipsnake and an Eyed Lizard from France; South American Rattlesnakes from Sao Paulo; and a Hermann's Tortoise from Rome. The latter is new to our collection.

Elliot Medal Awarded for Book on Fishes

Dr. Henry B. Bigelow of Harvard University has been awarded the Daniel Giraud Elliot Medal for his senior authorship of "Fishes of the Western North Atlantic, Part I," published in 1948 by the Sears Foundation for Marine Research. Director John Tee-Van of the Zoological Park was editor-in-chief of the monumental volume which covered lancelets, cyclostomes and sharks.

The Elliot Medal is awarded annually to the author of the work in zoology or paleontology which the National Academy of Sciences considers the most meritorious of the year.

Snakebite Article Published As a Separate Pamphlet

The article by Dr. James A. Oliver, "The Prevention and Treatment of Snakebite," published in the May-June issue of ANIMAL KINGDOM, has been published as a separate pamphlet of 32 pages, and is available from the Publications Office at the Zoological Park, New York 60, for 30 cents a copy.

A Correction

In the September-October issue of ANIMAL KINGDOM it was stated that an Okapi in the Rotterdam held the longevity record for its species. This was an error; the animal in question lived for more than sixteen years in the Antwerp Zoo.

Fellow Receives Pasteur Medal

Dr. David Nachmansohn, a Fellow of the New York Zoological Society, has been awarded the Pasteur Medal by the Society of Biological Chemistry in France for his work on the chemical mechanism of conduction in nerves. The Electric Eel has been an important tool in Dr. Nachmansohn's studies.

Mr. Crandall Honored

General Curator Emeritus Lee S. Crandall has been made an Honorary Member of the International Association of Directors of Zoological Gardens, the second such member to be created. He was also the recipient of the first Citation of the American Association of Zoological Parks and Aquariums, awarded at its convention in Montreal in September.

Off to Trinidad

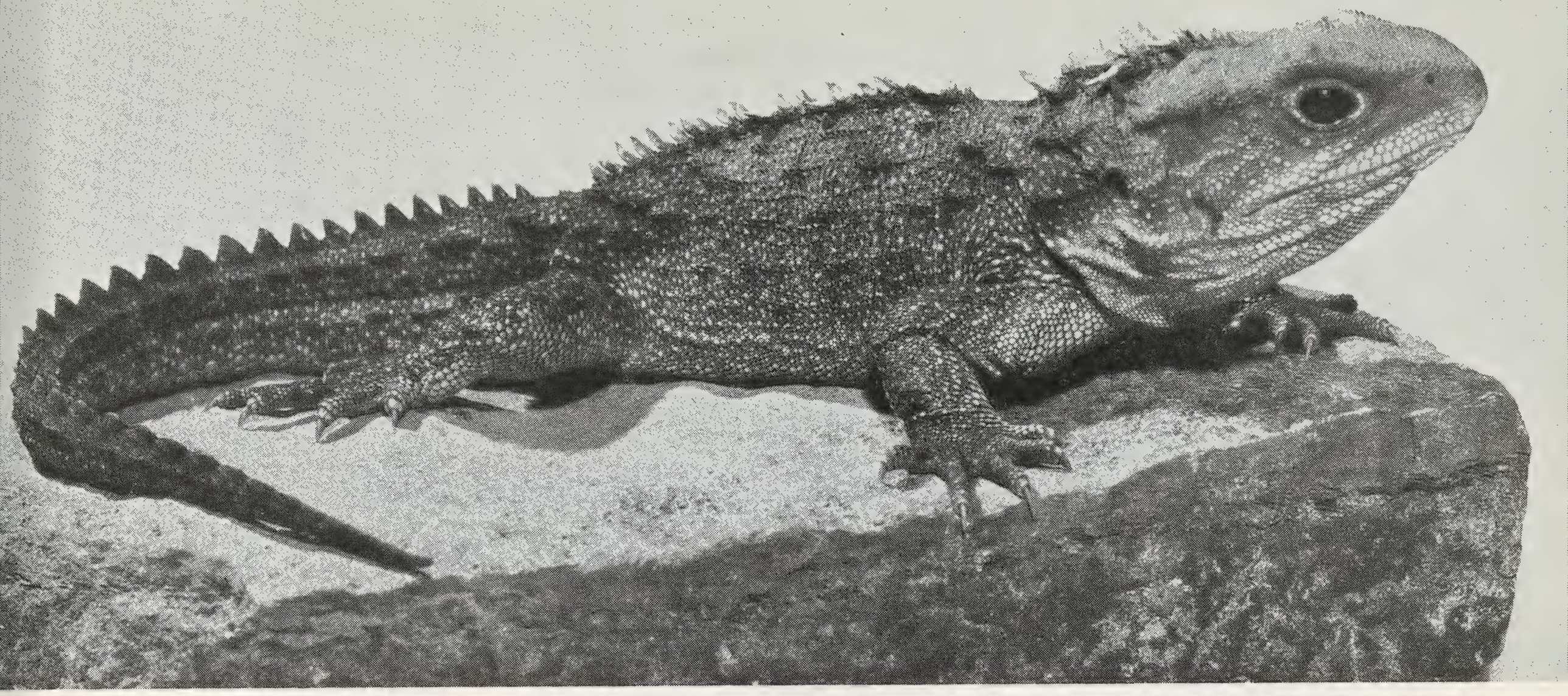
The Department of Tropical Research staff sailed on November 14 for Trinidad to resume work in the department's laboratory at "Simla," in the Arima Valley. In the party were Dr. William Beebe, Director Emeritus; Miss Jocelyn Crane, Assistant Director; and Miss Rosemary Kennedy, Assistant. Henry Fleming, Entomologist, flew to Trinidad December 2.

Our Fish Specimens Sent to U. S. National Museum

Throughout ten years spent in Bermuda, the Department of Tropical Research made an elaborate collection of shore and surface fishes. These were used in the preparation of the volume "Shore Fishes of Bermuda" by William Beebe and John Tee-Van. The value of this collection for study and reference is very great, so the United States National Museum, through Dr. Leonard P. Schultz, was glad to accept it as a gift. The collection will now be cared for in the National Museum for the perpetual use of students and specialists. Forty-six cartons have been shipped from the Department to the National Museum.

Bird Species Threatened in the Caribbean

TWENTY SPECIES of birds of the Caribbean region and Latin America were proposed as additions to the List of Most Threatened Bird Species compiled by the International Union for the Protection of Nature, at a conference in Caracas, Venezuela, on September 8. Dr. S. Dillon Ripley, associate curator of the Peabody Museum of Natural History at Yale, represented the New



One of the world's greatest reptilian rarities — the Tuatara — has come into our collection for the first time and is on exhibition in a special refrigerated compartment in the Reptile House. It is the only living representative of the Order Rhyncocephalia, and we now exhibit all living orders of reptiles. Dr. Oliver will write on the Tuatara in a later issue of "Animal Kingdom."

York Zoological Society at the meetings associated with the Third General Assembly of the International Union for the Protection of Nature.

The following species were listed as provisional additions to the I.U.P.N. list:

Diablotin or Black-capped Petrel, *Pterodroma hasitata* (Kuhl)
Flamingo, *Phoenicopterus ruber* Linnaeus
Cuban Hook-billed Kite, *Chondrohierax wilsonii* (Cassin)
Puerto Rican Sharp-shinned Hawk, *Accipiter striatus venator* Wetmore
Griscom's Guan, *Crax rubra griscomi* Nelson
Ocellated Turkey, *Agriocharis ocellata* (Cuvier)
White-crowned Pigeon, *Columba leucocephala* Linnaeus
Jamaica Blue Pigeon, *Columba inornata exigua* (Ridgway)
Puerto Rican Blue Pigeon, *Columba inornata wetmorei* Peters
Puerto Rican Parrot, *Amazona vittata vittata* (Boddaert)
Virgin Islands Screech Owl, *Otus nudipes newtoni* (Lawrence)
Puerto Rican Short-eared Owl, *Asio flammeus portoricensis* Ridgway
Quetzal, *Pharomachrus mocinno mocinno* (De la Lave)
Costa Rican Quetzal, *Pharomachrus mocinno costaricensis* (Cabanis)
Martinique Trembler, *Cinclocerthia ruficauda gutturalis* (Lafresnaye)
St. Lucia White-breasted Thrasher, *Ramphocinclus brachyurus santae-luciae* Cory
Guadelupe Forest Thrush, *Cichlherminia l'herminieri l'herminieri* (Lafresnaye)
St. Vincent Solitaire, *Myadestes genibarbis sibilans* Lawrence
Semper's St. Lucia Warbler, *Leucopeza semperi* Sclater
Venezuelan Red Siskin, *Spinus cucculatus* (Swainson)

In regard to the Flamingo colonies in the Caribbean area, Robert P. Allen reported that the colony on Andros Island in the Bahamas has been continuously disturbed since 1946. In 1952, 36 birds were present at this once-great colony, but were not breeding, and only 12 young were raised in 1951.

In the present year there are four nesting groups, two in the Bahamas, one on Yucatan and one on Bonaire Island, and between them they total 23,000 to 25,000 birds. It is believed that about 7,500 birds were reared this season.

The Bonaire Island colony is well protected and protection is being extended to the colony on Great Inagua Island in the Bahamas, Mr. Allen reported.

He added, however, that while the figures might indicate a safe margin for the species, the numbers are deceptive. Mortality in the species is naturally high, and it is not unusual for the colony to skip breeding for one season because of weather or other conditions. Consequently a numerically large group is needed at any one time to weather out a non-breeding season or two, and if the species should continue for as long as five years without breeding, it might be that the whole population would die out.

PUBLICATIONS OF INTEREST

ANIMAL WONDER WORLD. By Frank W. Lane. 75 illus. from photographs. 300 pp. Sheridan House, New York, 1951. Price $4.00.

Unusual though many of Mr. Lane's presentations may be, few are quite as wonderful as the author's uncanny ability in hunting out the innumerable quotations and authorities included in this interesting book.

Most of the thirteen chapters are devoted to long series of statements, usually documented, strung together in support of a stated theme: The Split Second in Nature, Fish With an Ear for Music, Danger! Flying Birds, Animal Accidents, etc. Many of the "Animal Accidents" will not have been noted previously by most readers. Accounts of birds crashing the windshields of planes are somewhat lengthy and the section on "Some Experiments with Animals" seems scarcely adequate. In general, however, Mr. Lane's remarkable collection of material has been collated with pleasing skill and discrimination. A thirty-four page bibliography, said by the author to contain "600 odd entries," is a useful list of references.

— L.S.C.

New Members of the New York Zoological Society

(Between September 1 and October 31, 1952)

Founder
John Roger

Fellow
Dr. Charles Schroeder

Contributing
Miss Amy Hope Ballard
Richard J. Bernhard
Leonard E. Finkel
Kurt F. Frey, Sr.
Robert M. Gaylord
Harry Peale Haldt
Sherwood Hamilton
Walter V. Landeck
R. B. LaRue
Mrs. Chester T. Reed
Benjamin Rowland
Henry H. Russell
Mrs. Charlotte L. Russell
Miss Hannah B. Walsh
Dwight Winter

Annual
Jerome W. Bernstein
Guido Borghi
George Bott
Mrs. George Bott
Mrs. Robert C. Bourne
Arthur C. Boyce
O. R. Burger
Mrs. Carmen V. Callahan
Albert E. Cleghorn
Irving J. Fajans
Joseph Fevoli
Master Ricky Fields
Alexander Fine
Mrs. Hugh Alan Grady
Clark Hubbs
Albert Kindler
John Kinzig
Dr. Philipp Manecke, Jr.
Edward I. Miller
John I. Moore
Dr. F. Donald Napolitani
Edward K. Newton
William S. Orkin
Thonglaw Punyanitya
Dr. Samuel Schecter
Saul Waldman
Major A. N. Weinman
Mrs. H. A. Wieschhoff

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Herbie's Nose is out of Joint

— at least it ought to be, if a walrus can have a disjointed nose. Up until one day last summer this arctic tot Herbie was our candidate for the Animal-Most-Likely-to-Succeed. Then along came a beguiling baby elephant and she seems to be running Herbie a tough race. But it's always like that at the Zoo. Before Herbie, Sumaili, the baby Mountain Gorilla, held the popularity crown, displacing Andy the infant Orang, now a big gruff boy.

Every year some charming new animal arrives at the Zoo to displace the former title holder. That's the way it should be, for after all it is this Society's business to press forward constantly in the search for new ways of interpreting the charm and beauty and the "naturalness" of the animal world to the millions who visit us every year.

Don't You Know Someone Who Would Like to Join?

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